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# ARCHIVES OF PEDIATRICS.

A MONTHLY JOURNAL DEVOTED TO THE  
DISEASES OF INFANTS AND CHILDREN

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## EDITORIAL.

### THE IMPORTANCE OF CARING FOR THE DECIDUOUS TEETH.

It is pleasing to note the interest in the care of children's teeth which is being more and more displayed by physicians. The medical profession apparently has awakened to the fact that these organs, located as they are at the anterior end of the alimentary canal, are of more importance than to adorn their possessor. Its members are examining the mouths of infants and children to discover irregularities in facial contour, the etiology of certain glandular involvements, and the effects of caries upon the teeth, making sure that these things are corrected in order to obtain for these little ones their proper comfort and development. This work should be carried on most assiduously by all practitioners in order to build up the general health of the child.



In the examination of the teeth of school children in some of our large cities the statistics gathered have been appalling. The Reading Dental Society conducted its second annual dental inspection of 1,883 public school children in the first grade with the following result: 2,934 cavities in permanent teeth, 8,311 cavities in temporary teeth, 717 putrescent pulps, 476 exposed pulps, 165 cases of malocclusion, 111 of mouth breathing. One hundred and one children, or almost 5 per cent., had had previous dental work done. The children of this grade are principally six or seven years old. This is only a sample of conditions prevailing the world over.

Time was when caries was not so prevalent as it is at the present time. People were not eating the finely prepared foods that we use today. Their beef, for example, was not cared for in the way we now have it, and the tender steaks of to-day were a luxury not a necessity. The use of these finer grades of foods means less exercise for the oral tissues.

Man has gradually come to rely upon the brain instead of muscle in advancing himself. He has thus allowed, through less use, many of the formerly important organs to assume a less valuable rôle in the human economy. This is true of the teeth, and, consequently, we find a greater degree of susceptibility existing than formerly. Man, too, now has less need for his olfactory and auditory senses, he being no longer dependent for existence upon the search for game in the open. This has brought about a greater or less degree of degeneration, especially in the size and freedom from obstruction of the nasal tract. Consequent upon this is a greater degree of deformity of the upper arch, and a more pressing need for correction of these conditions. One very important consideration in the prevention of deformity is the preservation of the temporary teeth.

Many parents erroneously suppose that inasmuch as the deciduous or temporary teeth are destined to last but a few years they need little or no attention. They usually assume that the teeth are placed in the mouth for masticatory functions only, and do not realize that the size of the maxillary bones depends upon the number of teeth retained in the arches from infancy on. Even some of our scientists of the past have supposed the teeth of secondary importance to the development of the bones, and until recent years extraction was resorted to when any crowding or overlapping occurred. The former was an er-

roneous idea of conditions, and the latter a faulty attempt at correction.

From the fourth or fifth month to the seventh year the maxillæ should accommodate up to twenty teeth of the temporary set. These should be arranged regularly in two arches of ten teeth each, in such a manner that those in one arch properly occlude with those in the other. The individuals in these arches should be properly cleaned as such and not in a careless way that would afford only the most prominent surfaces or cusps of each the necessary cleanliness.

During this period when the child is under the sole scrutiny of parents and the physician, intelligent effort should be made to defeat any processes which might tend to deprive the child of even one of these useful organs. Careful examinations should be made from time to time and any carious areas, however small, taken care of before they assume a depth that would be apt to cause pain if touched. As we all know, a child is far more tractable if no severe pain be inflicted. In order to make willing patients of these little ones it is necessary to discover the defects while they are superficial and care for them at once rather than allow the destruction to go on to the pain-producing point.

We have not only to consider the temporary teeth at this time, but also the permanent ones, which, although imperceptible, are yet being formed and must be provided for.

Even at birth calcification has commenced in some of the permanent teeth underlying the temporary ones, and any nutritional disturbances or febrile conditions may upset Nature's plans and cause at least a temporary atrophy of the developing permanent members. One of the most prolific causes of these former disturbances is the inability of the child to properly masticate the food. If caries is allowed to enter upon the scene at this time and is neglected, dire results may be expected to follow.

Imagine a child with three or four carious teeth on each side of the mouth. Each of these cavities is more or less sensitive to the pressure of food in mastication. Is it not easy to see how with such a condition very little pressure will be exerted by the child in chewing or how the unfortunate will soon learn to swallow the bolus in an improperly masticated and insalivated condition rather than suffer pain from proper mastication? The result is only too apparent.

We might argue that the child's food does not need as

thorough maceration as that of the adult because it consists of so great a proportion of carbohydrate matter which seems so soft and easily taken care of by the digestive apparatus. Here again we would be in error.

As is well known, the various foods of this type need more thorough grinding and trituration than do the proteid foods as a class. In a close study of the dentitions of various animals we find in carnivorous animals teeth of a simple cone shape or a combination of sharp cones or blades. These are used in tearing flesh which constitutes their diet. In the herbivorous animals we find the other extreme in the highly developed molars, with long and broad masticating surfaces roughened by numerous papillæ or ridges with grooves and pits between. These were developed to triturate the seeds, grasses and grains that constitute a carbohydrate diet.

So also we find in the carnivorous animal a hinge type of temporomaxillary articulation, which allows practically no lateral motion to the inferior maxilla and consequently permits of no grinding of food. In the herbivorous ones we find a broad-surfaced loose articulation best suited to the needs of these creatures, as it encourages motion in all directions making this dentition an ideal grinding apparatus. Nature thus proves to us that the carbohydrate foods need more thorough comminution than any others. This is another strong argument in favor of the care of children's teeth.

It has also been observed that in those human beings who lack the molar teeth many starch grains are evident in the feces and in those lacking the cuspids and bicuspid we find meat fibers. After a replacement of these lost teeth with artificial ones these grains and fibers disappear. Is it not plain, then, that all of the teeth are necessary for the child as well as the adult? And is it not necessary, considering the age of these little ones, that those in closest touch with them should be constantly on the alert to detect any signs of caries or other abnormal conditions, and to insist upon the maintenance of a most perfect state of cleanliness of the entire oral cavity?

The natural overseers at this time are the parents and the physician, and it most certainly rests with them to prevent a recurrence or continuation of the neglect which in past generations has rendered so many teeth useless.

S. WELLING VAN SAUN, D.D.S.

## ORIGINAL COMMUNICATIONS.

5

### HOSPITALS FOR THE CARE OF INFANTS AND CHILDREN AND THE METHODS OF PREVENTION OF INFECTION.

#### SECOND PAPER.\*

BY HENRY KOPLIK, M.D.,

New York.

In my first paper on this subject I laid stress on the following points:—

(1) Infection is avoided by strict attention to detail in nursing.

(2) The system of individual utensils for the care of each infant or child is a primary necessity.

(3) It is desirable that nursing infants be treated in wards or hospitals devoted exclusively to them.

(4) It is not desirable to construct wards which hold large numbers of infants or children.

(5) The modern tendency is distinctly in the direction of dividing infants and children into small groups and separating them by means of the box or glass room construction.

(6) In non-contagious service the small segregating box of the French system is not a necessity.

(7) In a contagious service the method of separating individual beds by means of glass partitions or of placing two or three patients in a glass room or box is the ideal system.

The disadvantages of the box system are principally those of cutting the ward up into smaller units and that of insufficient ventilation if the box is small. It is but fair to state that in France the box system has not been universally adopted, and even men such as Lasage, whose wards are divided into boxes regard the whole system as in the experimental stage.

In view of these facts it is of great interest to study the asylums or hospitals both for infants and children which have been constructed, or are just completed, in Germany. I have described the Kaiserin Augusta Victoria house in Charlottenburg near Berlin, but this is not a hospital, but an asylum for the housing of infants and prematures. Two recently con-

\* The first paper on this subject appeared in the ARCHIVES OF PEDIATRICS for September, 1911.



structed hospitals for infants and children in and near Berlin give an opportunity to see how far the idea of separation of units of infants and children has been adopted. The hospitals devoted exclusively to the care of infants and children below the age of two years show how far we may go in both ward construction, open air management and detail nursing. The latest hospital of the class is that of Weisensee near Berlin. Weisensee is a borough about twenty minutes removed from Berlin. The hospital is situated in the center of a park reservation and consists of several pavilions. A main pavilion of forty-five beds, with administration rooms and private rooms, eight beds for patients and mothers, and accommodations for wet nurses, and nurses of the training school. In a separate building connected by a corridor with the main building is a lecture hall of modern type accommodating about sixty persons. There is an isolation pavilion for the care of pertussis and other diseases of eleven beds in units of five and six, and the fourth building is a mortuary, and finally a sixth building in which there is situated a cow-shed for the accommodation of 35 cows, with a laboratory for the preparation of the infant foods and a laundry.

It will thus be seen that this is quite an extensive plant designed primarily to house 65 infants, and is planned on the most economic scale at the same time presenting features of the most advanced type. The cost of 500,000 marks seems incredibly small. Of great interest is the construction plan of the wards, which follows closely that of the celebrated "Sauglingsheim" in Munich, but which to me appears more complete and attractive, and at the same time embraces the principles laid down in the early part of this paper, the division of the patients into small units of 5 and 10 to a room. The wards are so planned that the pavilion in its exposure lies north and south, the patients' wards face the south, the serving rooms lie to the north. Another beautiful feature in this hospital is that the small wards open directly into a broad covered veranda or loggia, so that in both fine and even inclement weather the infants can be out of doors. In fine weather exposed to the sun, in blustery or cloudy weather they can be fully protected by well arranged awnings. The small beds can be moved directly on the "loggia" or balcony from the ward without any great exertion or inconvenience.



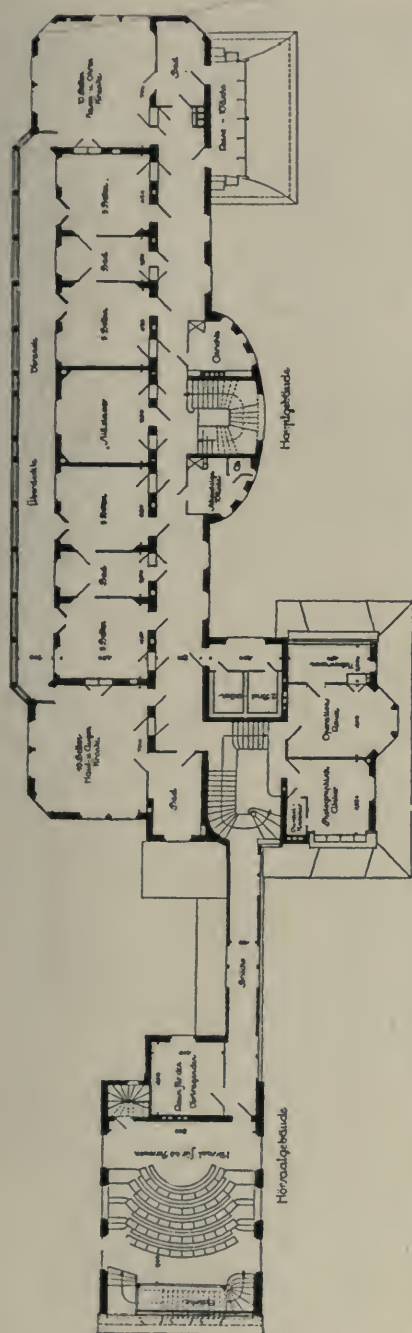


FIG. 1.—Plan showing main pavilion and the wards and small service rooms between two wards and the large terminal wards and veranda to the left connected by a corridor to the amphitheatre.

By a study of the accompanying plan it will be seen that the wards are in pairs each containing five beds separated by a service room for bathing, examining and operating. All the partitions are of glass to about four feet of the floor, so that standing in one ward a person can see what is going on in the service room and neighboring wards. The loggia, or veranda, is of stone fully covered and extends along the whole south side of the pavilion. Stepping on to the veranda at any point all the little beds in the open are seen at once.

Every patient has his or her own utensils, such as a thermometer, wash rag, etc., attached either to the bed or under it. The floors are covered with a green linoleum cemented to the subbase with a wax cement, making a soft, resilient and extremely clean floor. A feature seen here,

as also in Munich, is the linen closet, which opens both into the wards and the corridor outside the wards, where it is faced with glass so that an attendant can see whether the closet needs replenishing without entering the ward.

There are laboratories for scientific work, and also on the ward floor of the building are two incubator rooms for premature infants. The other floors contain rooms for the nursing personnel and midwives. The isolation pavilions are away from the main building and the wards are so constructed that here also the infants can be placed in the open in fine weather.

The cow sheds are of the Dutch model type, and the diet kitchen possesses every device for the scientific preparation of the food for the patients. It will thus be seen that in this plant have been combined the most modern ideas in the care of infants. The architect has departed as far as possible from the old ideas of ward construction, the infants are in units of five or ten, the larger number of infants being housed in the terminal wards at the ends of the pavilion so that in these larger rooms with ten infants light reaches the wards from more than one point.

The infants enter reception wards and after a sojourn pass to the permanent wards. The glass partitions between the wards have been adopted, but at the same time they do not follow the box system, but rather suggest it. The wards are all situated facing south, and thus in inclement weather the brunt of exposure does not reach this side of the pavilion.

Another hospital worthy of study is the Kaiser and Kaiserin Friederich hospital in Berlin. This is the hospital under the direction of Dr. Baginsky. As is well known, this institution originally housed infants and children suffering from contagious diseases. Lately the municipality of Berlin has taken charge of the hospital and it has been enlarged by the addition of new pavilions. These pavilions are constructed on a plan of the long corridor system; on the south side of the pavilion are situated the rooms for the patients; on the north side the service rooms. The wards are separated by glass partitions, are very bright and hold from two to six beds. There is an incubator room. The bath-rooms and milk store-rooms are on the north side. The space allowed for each bed is 32 cubic meters of air. Each child has its own utensils, which are contained in small recesses or

glass closets above each bed. The shower bath seen in the Vienna children's hospital is also seen here, the temperature of the water being secured by special apparatus.

Inasmuch as we are now interested in general ward construction, I will not enter into all details which are provided here for the prevention of infection, but which are well-nigh perfect. Although these wards house infants from the tenderest age as well as premature infants, I understand that it is the intention to also care for older children suffering from non-communicable diseases.



FIG. 11.—Sketch showing the general plan of the new pavilions in the Kaiser and Kaiserin Friederich hospital wards, with glass partitions to the south housing two to six beds, corridor and service rooms to the north.

Standing at one end of the corridor the whole series of rooms divided by glass partitions are visible and the beds with them. The question of ventilation is an all important one. In the Pasteur Hospital, though the ventilation is sufficient it is by no means perfect. In Weisensee, I found the ventilation on a cool September day excellent. In this hospital the long sunny veranda stretches along the south side of the pavilion, the corridor along the north side. The wards are in between both and open on the veranda and on the corridor, so that there is a thorough draught of air. In those hospitals in which the pavilion is divided up into glass rooms, each glass room provided with a window on the south side and a door opening into a service corridor on the north side there is not so much natural ventilation and an artificial system of ventilation is provided.

In Vienna, among the new clinics for children some of the pavilions are constructed on the glass room plan. A pavilion is divided along its length into glass rooms but differing from anything I have described. The series of glass rooms runs along the center of the pavilion with a corridor on each side.

The windows open into the corridors from the glass rooms and the corridors open into the outer air. Thus the light and air reaches the glass rooms from the corridors. This arrangement necessitates also a system of artificial ventilation, and though I saw the pavilion described in an unfinished state, I should suppose the lighting and airing of these rooms would be a very knotty problem; in fact, difficult. Although each child in a room may have a sufficient amount of cubic air space this air must be rapidly and equably renewed, else a stuffy and undesirable condition of the atmosphere around the patient will result and nullify any precautions as to asepsis and prevention of infections by reacting against the patients themselves, especially in contagious diseases. Architects should remember this very important point. The division of a large room into closed boxes open at the top is also not a perfect system. In the Herold Hospital of Paris one cannot say that the air in the boxes is renewed sufficiently to prevent at least the accumulation of a certain amount of dead air at the bottom of the box where the patient lies.

This brings me to the point of the development of the present system of construction as seen at Weissensee as an outcome of the box system in non-contagious services and more desirable than the primitive box, because there is no breaking up of space by arbitrary partitions and the ventilation is natural and perfect. In the "Sauglingsheim" at Munich the construction is that of the wards on the south side of the pavilion and the corridor on the north side, with service rooms opening out upon this corridor. Here the arrangements remind one more of that seen in the Pasteur Institute and the new pavilions of the Kaiser and Kaiserin Friederich Krankenhaus in Berlin. The veranda, or loggia, is to one side at the extreme ends of the pavilion constructed of stone; the beds can easily be moved into the open. I found the ventilation excellent on a stormy, rainy day, when it was necessary to keep windows and doors well closed, which speaks well for the system of ventilation. I noticed that each glass room was lit by windows, and the light streamed into them so much that even on a bleak day the wards looked cheerful.

In the above descriptions of the most modern hospitals for the housing and treatment of infants and children I have necessarily been sketchy, but in avoiding technicalities I have en-



deavored to bring out the excellent points in the construction and to point out in a critical manner the main difficulties which will confront those whose responsibility lies in advising and constructing new hospital plants for infants and children. My reason for this has been twofold—first, in America we are sadly lacking in any hospitals for infants and children to which we can compare those I have just described; and again there is a tendency among medical men who have the advising and responsibility of construction to either ignore the recent advances in the art and science of hospital construction, or to imagine that if a ward is equipped with a few glass boxes or partitions that all the purposes of modern ward construction are subserved. This certainly is not so, and I feel that if I can impress these facts on my readers this study will have served a purpose.

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PERONEUS PHENOMENON AS EVIDENCE OF SPASMOPHILIA.—Lust (*München. med. Woch.*, August 8, 1911) lays great stress on the presence or absence of this phenomenon in the diagnosis of tetany in children. It may be present when other specific tests give negative results. The author naturally relies on the incidence of laryngospasm, eclamptic attacks, increased cathodic excitability, the facialis phenomenon, etc., as far as practicable; but in so-called latent spasmophilia, as evidenced by the negative result of these standards, he finds the peroneus phenomenon almost invariably present. Although it may be the sole evidence of spasmophilia, the author is not inclined to belittle its significance. He rates it as much more conclusive than either Trousseau's or Chvostek's sign. In fact, if he fails to obtain this sign he would exclude spasmophilia. The peroneus sign seems to have been elaborated independently by the late Prof. Escherich and the author. It rests upon the question of the increased mechanical excitability of peripheral muscles. Other pediatricists had noticed the association and naturally the facialis phenomenon is of the same type.—*Medical Record.*

# THE DIAZO REACTION IN SCARLET FEVER AND SERUM SICKNESS.

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AND

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During the past year a large number of patients treated in the diphtheria wards of the Philadelphia Hospital for Contagious Diseases developed serum "rashes." The administration of both raw and refined or concentrated antitoxic sera produced these cases of serum sickness. The rash in many cases bore a very striking resemblance to true scarlet fever. Of the three main types of serum "rashes," scarlatiniform, morbilliform and urticarial, the first is by far the most difficult of differentiation from scarlet fever, and consequently the handling of such cases becomes one of the greatest problems in the hospital management of contagious diseases. The difficulty of diagnosis is further increased by the fact that many of these scarlatiniform rashes develop from the second to sixth day after the administration of serum, which interval corresponds to the accepted incubation period of scarlet fever. Since it is practically impossible to prevent scarlet fever from making its appearance in a diphtheria ward, the diagnosis of these particular cases becomes a matter of serious importance, especially from the standpoint of infection.

Serum sickness is not caused by the antitoxic bodies contained in the serum, but is directly due to the serum itself. The severity of the symptoms bears some relation to the amount of serum administered, which lead to attempts to concentrate the serum, although as before written, the concentrated serum produced the same kind and almost the same proportion of rashes as the raw product. Certain lots of serum caused more cases of serum sickness than others, substantiating Park's claim that certain horses yield a serum producing a high percentage of these "rashes." The exact cause of serum sickness has not been determined. According to the theory of von Pirquet and Schick the injection of serum into man acts as a foreign body and stimulates the production of protective substances or antibodies. These antibodies are not in the nature of precipitins. It is supposed that some of the serum injected remains free in the system and meeting with these antibodies produces the toxic principles re-

sponsible for the symptoms of serum sickness. One administration of serum, therefore, is able to produce serum sickness, the so-called period of incubation of five to fourteen days being the time necessary for the development of antibodies to the serum. The experiments of Gay and Southard throw doubt upon this theory. They believe that horse serum contains a substance, "anaphylactin," which is not neutralized by the tissues and is slowly absorbed and eliminated. This substance is supposed to act as a continuous stimulant to the body cells so that their avidity for the other constituents of horse serum is enormously increased. After an interval of about two weeks these functions of assimilation may be overwhelmed by a second injection of serum or by the constant stimulation of the first dose with the result that "functional equilibrium is so disturbed that local or general death may follow." This constitutes "anaphylaxis." Considerable experimental work and reports bearing upon this interesting condition have had the unfortunate tendency to intimidate the practitioner so that many hesitate to administer serum in diphtheria in fear of anaphylaxis. As a matter of fact serum sickness is without danger and alarming symptoms or a fatal outcome attributable to serum are very rare indeed when one considers the quantities of serum used to-day in the treatment of diphtheria.

Ker, in his excellent work on "Infectious Diseases," writing of the difficulties in differential diagnosis between the rash of true scarlet fever and serum sickness states that the "diazo reaction is invariably absent in serum rashes. If the urine, then, gives the test the presumption is in favor of scarlatina, in which disease the reaction not infrequently occurs." Rivier, quoted by Simon, found the diazo reaction positive in about 56 per cent. of cases of scarlet fever and absent in scarlatiniform erythema due to serum and concludes that if the reaction is positive scarlatina may be affirmed, while if negative there is strong presumptive evidence against the disease. Clemens, in a collected series of cases, found the diazo reaction positive in 30 cases of 87 examined. He does not report upon serum sickness. The literature upon this phase of the subject is quite meagre. Accordingly we thought it advisable that a study be made of the diazo reaction in these cases to ascertain its value from the standpoint of diagnosis.

This report consists of a study of 502 cases. It was neces-

sary to determine the frequency in which the diazo reaction occurs in scarlet fever and diphtheria before its value in diagnosis could be settled. Accordingly, the object of our study was threefold:—

(1) To determine the percentage of positive reactions in scarlet fever according to the stage of the disease.

(2) The frequency in which the diazo reaction occurs in diphtheria.

(3) To study the reaction in cases of serum sickness.

At the time these studies were being made a few cases of measles and varicella were in the hospital. These cases were also examined and results are given to add to general interest in the subject. While various methods have been proposed since Ehrlich announced his discovery all depend upon the principle of treating the urine with diazo-benzene-sulphonic acid and ammonia, which, if the chromogen be present, imparts a red color to the urine. The correct interpretation of results is one of the most difficult of the simpler laboratory procedures for the dark brown and even reddish tint found in many specimens of urine may be easily mistaken for a positive reaction. Until one becomes thoroughly familiar with the reaction it is well to have a positive urine for comparison in doubtful cases. The reagents, especially the nitrite solution, must be fresh and accurately prepared. The test tube must be thoroughly shaken and the color of the froth noted. In doubtful cases the tube should be set aside over night to determine whether or not a greenish deposit forms, which is corroborative evidence of a positive reaction.

*Scarlet Fever Cases.*—Urine from 375 cases were examined, with an average of 8.53 per cent. positive reactions. A small percentage of these showed the presence of albumin in the urine, but there was no relation between this finding and the diazo reaction. The following table is composed of these scarlet fever cases divided into various stages of the disease with the number and percentage of positive reactions:—

1st week	52 cases,	with 9, or 17.3 per cent.,	positive.
2d	“ 51	“ “ 4, “ 7.8	“ “ “
3d	“ 36	“ “ 2, “ 5.6	“ “ “
4th	“ 68	“ “ 3, “ 4.4	“ “ “
5th	“ 64	“ “ 3, “ 4.6	“ “ “
6th	“ 46	“ “ 1, “ 2.1	“ “ “
7-12th	“ 58	“ “ 1, “ 1.7	“ “ “



The largest number of positive reactions occurs in the first week of the infection during the presence of the rash. It gradually disappears as convalescence progresses. However, we did not find the percentage of positive reactions we were led to expect from the reports of others.

*Diphtheria Cases.*—Because the serum rashes developed in patients who were suffering or had suffered with diphtheria, it was necessary to study a number of uncomplicated cases of this infection to determine the frequency of the diazo reaction. The following table is composed of 56 cases with a general average of 5.4 per cent. positive reactions:—

1st week	31	cases,	with	4,	or	12.9	per cent.,	positive.
2d	“	15	“	None	positive.			
3d	“	10	“	“	“			

As will be noted, a positive reaction is by no means a rare occurrence during the first week of diphtheria. Rivier, quoted by Simon, found the reaction positive in about 3 per cent. of uncomplicated cases.

*Serum Sickness Cases.*—The majority of these cases were studied soon after the eruption appeared. The various types of rashes develop at varying intervals following the administration of serum. Of the 16 cases presenting a scarlatiniform rash, all appeared in from two to ten days; urticarial rashes usually develop in the second or third week and morbilliform rashes in the second week after the administration of serum. In all, 37 cases were studied with a general average of 10.8 per cent. positive reactions:—

Scarlatiniform rashes	16	cases,	with	1,	or	6.2	per cent.,	positive.
Urticarial	“	18	“	“	2,	“	11.1	“
Morbilliform	“	3	“	“	none	positive.		

Most interest centers about the cases with scarlatiniform rashes because these are so difficult to differentiate from the exanthem or true scarlet fever. The history of the 1 case yielding a positive diazo reaction is as follows:—

Anthony R., age five years, admitted March 27, 1911, suffering with laryngeal diphtheria. Patient received 9,600 units of antitoxin immediately upon admission and an equal dose was

given on the following two days. On April 1st, or five days after receiving the first dose, he developed a scarlatiniform rash over chest and abdomen without any other symptoms of scarlet fever. Case was diagnosed serum sickness, made an uneventful recovery and did not desquamate. The positive reaction may have been due to diphtheria.

It was not the finding of this one positive reaction in a case of serum sickness which has taught us to place little value upon the diazo reaction in differential diagnosis, but the fact that the reaction is positive in only about 15 per cent. of scarlet fever cases during the early stage when the rash is present. Likewise the diazo was found positive in 12.9 per cent. of diphtheria patients during the first week of the disease. It is during this week that the scarlatiniform rashes are so prone to develop. Therefore a positive reaction may mean scarlet fever, diphtheria or, much less likely, serum sickness. A negative reaction has even less value in diagnosis.

*Measles Cases.*—During the severe epidemic of measles in Philadelphia in the winter and spring of 1911 several cases of scarlet fever and diphtheria were admitted to the hospital while in the incubation period of measles. In all, 27 cases were studied, 22 of these cases being in the scarlet fever and 5 in the diphtheria department. The following table gives the number examined and percentage of positive reactions according to the stage of measles divided into periods of weeks:—

1st week	8 cases,	with 6,	or 75.	per cent.,	positive.
2d "	4 "	" "	2, "	50.	" " "
3d to 5th	15 "	" "	2, "	13.3	" " "

The highest percentage of positive reactions occurs in typhoid and measles. While the morbilliform rash is usually not difficult of differentiation from true measles, yet in a doubtful case a positive diazo would likely be of considerable value in aiding a diagnosis. In our experience the reaction has been negative in cases of serum sickness presenting morbilliform rashes.

*Chicken-pox Cases.*—Opportunity was offered for study of cases of this infection. Two cases developed within the first week of scarlet fever and one of these gave a positive reaction which, however, may have been due to the primary infection. The remaining 6 cases occurred during convalescence from scar-

let fever and all were negative. We are led to believe that the diazo reaction in chicken-pox is uniformly negative.

*Conclusions.*—(1) The diazo reaction was found positive in 17.3 per cent. of scarlet fever and 12.9 per cent. of diphtheria patients during the first week of these infections. It is during this week that scarlatiniform serum rashes are so apt to develop and make a differential diagnosis from scarlet fever quite difficult.

(2) The percentage of positive reactions in serum sickness is much lower. A few positive reactions were found averaging 10.8 per cent. for all kinds of rashes, but many of these positive results may have been due to diphtheria. The value of the diazo reaction in differential diagnosis is very slight, not because the reaction is occasionally present in a serum rash case, but because the percentage of reactions in scarlet fever and diphtheria is comparatively low and inconstant so that a negative reaction in a case presenting a scarlatiniform rash is of little value in excluding scarlet fever.

(3) Since the reaction is positive in 75 per cent. of cases of measles a negative reaction in a case presenting a morbilliform rash would be of value in differential diagnosis.

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PACHYMEINGITIS HEMORRHAGICA INTERNA IN INFANTS.—Hahn (*Deutsch. Med. Woch.*, August 17, 1911) states that quite recently we have obtained coherent information as to the existence of this affection in earliest infancy. He relates a case in detail and sums up what we know to date as follows: The condition represents a genuine pure fibrinous pachymeningitis with incidental hemorrhages. The latter were intradural and not upon an inflammatory basis, being associated with hydrocephalus externus. The localization was shown by the meningeal symptoms, the results of lumbar puncture and especially by the retinal hemorrhages. The entire syndrome appears to depend upon a friability of the blood-vessels, while the efficient cause is represented by traumatism. In the absence of a defective state of the blood vessels the predisposing cause should lie in the blood itself. The hemorrhagic factor is evidently the source of much controversy; while essential to the syndrome it is not invariably in evidence macroscopically.—*Medical Record.*

## ANESTHESIA IN THE SURGERY OF CHILDHOOD.\*

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Surgery in childhood compels increasing attention. Differentiation between child and adult is as needful here as in other branches of pediatrics. The subject is not new. Colby, in 1846, wrote what he claimed was the first work on all diseases—surgical as well as medical—of children. In 1863 the Council of the Medical Society of London, in drawing "the attention of the profession from the broad field of general medicine and surgery to the comparatively small one of the disease of children," designated "Surgery in Children" as the subject for three lectures by Mr. Thomas Bryant.

Among the many topics of importance and interest to the pediatricist to-day surgical anesthesia has an important place for two reasons: (1) The anatomy and physiology of the child demand as careful study in the administration of potent anesthetics as in feeding or medication. (2) A child is easily alarmed (and as easily reassured) and needs in the anesthetist the same good judgment as does an adult. Because he responds readily to the physiologic action of ether and chloroform is no excuse for nearly drowning him in ether and mucus or bringing him with chloroform so near to dissolution that the anesthetist and surgeon "sweat blood" and vow they will never use chloroform again.

Because he is easily overpowered is not sufficient reason for denying him an easy induction. In the present age a child should never have a horror of surgery engendered by the memory of an anesthetic.

A survey of the evolution of surgical anesthesia from the initial work of Dr. Long, in 1842, and Morton, in 1846, reveals three stages in progress: (1) Simply a state of analgesia, the abolition of pain alone being such a wonder then that troublesome reflexes, muscular rigidity and even semiconsciousness with voluntary struggling were gladly disregarded. (2) A deeper and longer anesthesia with entire unconsciousness was found possible and safe, though reflex and automatic movements were allowed which would now be deemed inadmissible. (3) A

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\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Spring Lake, New Jersey.



profound anesthesia with abolition of not only pain and automatic movements, but also reflexes, and prolonged indefinitely. This (with asepsis) has made modern surgery possible. But, fourthly, why not cross, now, the threshold into a new realm, refining our methods so as to approach nearer "the ideal anesthesia," which I would summarize in three requirements—an *induction*, prompt, tranquil and not unpleasant to the patient; an *anesthesia*, surgical, featureless, safe, just deep enough for the purpose each minute, and perfectly evenly maintained; a *recovery*, quick, without nausea, or symptoms, immediate or remote, referable to any organ, excretory, circulatory or respiratory.

For the purposes of the present discussion, let us consider the following:—

*Anesthetics.*—Nitrous oxid, ether and chloroform will alone be considered. Ethyl chloride might be added as of value, at times, for a short anesthesia or for induction in sequence with ether. Nitrous oxid has the same value and is unequalled as an anesthetic except by ether. Any child old enough to remember the event (that is, over three years of age) should not be crowded under rapidly by straight ether, to him a terrifying experience. But nitrous oxid followed by ether will give the easy, quick induction so desired by the surgeons and needed by the young patient. Moreover, experience will disclose increasing possibilities with nitrous oxid alone of an anesthesia maintained through a half hour or more for many operations. We are not speaking of infants or very young children. For them we choose ether, and here it *may* be pushed, or chloroform. Their respiratory capacity is too small for the use of gas.

Still greater facility is acquired with nitrous oxid and oxygen. This is the best anesthetic known. It meets all the requirements above, in induction, maintenance and recovery with present and lasting safety, more perfectly than any other. Its chief contra-indication, high blood pressure in diseased arteries, does not obtain in children. The only hindrance to its wider use is the apparatus and skill needed for its administration and the cost.

Chloroform, in spite of its narrow margin of danger—danger both to circulation under administration and to glands and muscles afterward—is an admirable anesthetic and well indicated in childhood (Snow). Then its dangers of degenerative tissue changes are less and those of circulatory and respiratory em-



barrassment may be mostly avoided by skilful administration. To give it like ether courts disaster.

Children reach anesthesia with less narcotism than adults (Snow), hence induction and recovery are more rapid. They are susceptible to dosage; and anesthetics belong in that group of *materia medica*, like morphin, whose doses are for children relatively small.

Ether is the usual resource, but an unfortunate phrase is "routine method," as if any child without a physical examination could be given an indeterminate dose for an indefinite length of time. "We have no absolutely safe anesthetic" (Herb).

*Methods of Administration.*—Ether is best given by the open method—Schimmelbusch mask; or semi-open—Allis inhaler. The proper mask, however, is not simply a few layers of gauze. It must have sufficient interstices to hold vaporized ether and breathing should be through it, not under it. And the ether should be dropped on continuously, not poured on intermittently. The Allis inhaler is the simplest efficient method for one not accustomed to the open mask.

For continuous administration during operations in throat or mouth an "etherized air" method is admirable. Its essentials are an air bulb pumping air through two bottles, one containing ether, by tubes to the patient. It is not only a convenience to surgeon and anesthetist, but it supplies an efficient, warm, dry, ether vapor to the patient—"pharyngeal insufflation."

Chloroform should be given very gradually, but continuously, never concentrated, always by absolute drops, watching during induction against the child's holding the breath and keeping during anesthesia one hand incessantly free for observing the pulse, and sensitive to any change—a guide as important under chloroform as is the respiration under ether. With chloroform (and even ether) it is possible to anesthetize a sleeping child, sometimes a great advantage.

Nitrous oxid has for older children a great field, producing very quickly, safely and comfortably a deep anesthesia and may alone carry the patient through the operation, air being admitted through the inlet valve. But any minute ether may be switched in (not changing the inhaler) and smoothly substituted. Nitrous Oxid and Oxygen (excluding the air) affords a method which approaches the ideal anesthesia. The technic involves a steady supply of gas with control of oxygen introduced in amount needed.

The proper position of the patient under any anesthetic is with the head on the side and low, mucus gravitating away from the larynx into the buccal cavity, whence it is easily removed by pressing the cheek without entering the mouth. The conjunctiva should never be touched, to test reflex.

*Contraindications.*—These in each individual case should be carefully considered. Heart diseases—congenital or acquired—if fully compensated, are not absolute contraindications, but if with any lack of compensation avoid chloroform. Obstruction to air passages by lymphatic hypertrophies is a very great embarrassment and “status lymphaticus” a serious condition to meet. Kidney lesions may be met without increasing the damage by giving but little ether and not prolonging the operation, hence nitrous oxid alone or in sequence with ether is to be chosen. Bronchitis and other respiratory inflammations contraindicate ether, but, without resorting to chloroform, nitrous oxid then ether, preferably by the “etherized air” method, furnishes so dry and unirritating a vapor that, with care in the amount given, most of the objection is obviated.

Atropin hypodermatically, well tolerated by children, finds a place here. Morphine, so useful in adults, especially for operations requiring more analgesia than anesthesia, has almost no place in children and increasingly less as the age is younger. It abrogates by its very physiologic action some essentials for perfection cited above, safety and delicacy of control of the depth of anesthesia, it increases nausea and prolongs recovery; and a quick recovery is in children even more important than in adults.

*Nurses as Anesthetists.*—Formerly it was thought “anyone can give the anesthetic.” Now we have learned it was a mistake, and even to medical graduates entrust this responsibility only after a time. The importance of anesthetics and need of refinement in methods has brought the suggestion that some nurse be especially trained as the anesthetist of a hospital. It commends her that she has the reputation of being able and willing to devote attention to one thing and do it well, and some are succeeding in it, but not because it is “routine” work. It would be gross misconception of this branch of surgery to make routine performance of what demands broad knowledge of physiology and materia medica, keen observation and good judgment in things preliminary and subsequent to operation, during progress of the anesthesia and, of course, in

emergencies—if they arise—with quickness of action. If the hospital interne was more inspired with interest in the subject and encouraged to feel this one of the most responsible duties of his clinical education we would have better anesthetists.

*Should the Anesthetist Watch the Operation?*—Certainly not. He has enough to watch. But this does not mean he should be ignorant of the stages of the operation. If really alert he will, without diverting his attention, instinctively follow proceedings and keep his patient beyond troublesome reflexes yet only just far enough for the existing purpose. This suggests also another, somewhat different point, which I never hear mentioned, the advantage of the operator watching the induction in order to make avail of the primary anesthesia, a stage of very great value and adequate for many short operations, but requiring close coöperation, the operator ready to work instantly on signal and the administrator ready to stop promptly.

There is a state of cyanosis with muscular rigidity which the operator is apt to think a sign for more anesthetic, whereas the administrator should know the need is for oxygen, the patient being, perhaps, deeply under with widely dilated pupils.

*Importance of Not Prolonging the Operation.*—I have had occasion in studying recovery to note the greater harm of prolonged over short operations. If of any importance in adults it is in childhood many times more essential that the operation should be as expeditious as possible. I believe we have been tempted by opportunity for deliberate work too far beyond considering elapsing time. "Children take a short anesthetic with less disturbance than adults, but it should not be prolonged" (Kelley, of Cleveland). "Despatch (which is not reckless haste) is too little appreciated in these days of anesthesia. I fear there are many victims to what is now boastfully styled deliberation" (Allis).

*Preparation and After Treatment.*—The anesthetist should be familiar with any organic diseases or abnormal conditions, making his own physical examination if not informed. Thorough preparation, as in adults, of stomach and bowels is important. But the loss of water by purgation and restricted diet should be replaced. If the stomach is clean drafts of water (only) in the evening and early morning up to two hours before operation serve this purpose, further cleanse the alimentary tract and supply a diluent and vehicle for elimination later of the anesthetic by the



kidneys. Water by rectum afterward also serves the purpose and abates the thirst (especially hard for children). Oxygen inhalations are an aid to recovery and should be used where the administration has been long and the patient much depressed.

I have recently designed an apparatus for the "etherized air" method for continuous administration of the anesthetic in operations in and about the mouth without interrupting the operator, thus leaving him and the administrator each absolutely independent of the needs of the other in the one field. Tonsils and adenoids, hare lip and cleft palate, glands of the neck, suggest kinds of operations common in childhood for which such means



NEW APPARATUS FOR "ETHERIZED AIR."

METHOD OF ANESTHESIA (PINNEO), "PHARYNGEAL ANESTHESIA."

Air is maintained, under a little pressure, in the bulb and controlled by cock to bottle No. 1 (filled with ether), through which it passes, then bottle No. 2 (empty), and thence to the patient through the tube (or through the catheters by Y tube). The bottles are suspended in the two-chambered vessel—one chamber filled with warm water. Continuous administration is thus maintained throughout any operations about mouth or throat.

are indispensable and hitherto not fully supplied. In addition to convenience it supplies a warm, thoroughly etherized air evenly administered. It consists of two bottles, with a control cock, an air bulb, a metal terminal for directing the vapor in the mouth (or a rubber catheter for the nostril when preferred) and a double chambered vessel for hot water in which the bottles are hung. The air is pumped through the ether, warmed, passed through the second bottle, and thence by rubber tube to the patient. It is a "pharyngeal insufflation."

## THE DIETETIC TREATMENT OF INFANTILE TETANY.

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In 1905 Finkelstein,<sup>1</sup> in his "Lehrbuch der Sauglings Krankheiten," speaking of spasmophilic conditions in infancy, says: "Probably the disturbance has nothing to do with the casein, the milk-fat, or the sugar, the addition of either of which substances to a mildly irritating diet (woman's milk, starch) has no disadvantageous effects, but the whey has the same irritating action as cow's milk, so that probably some substance dissolved in it is involved." This statement of Finkelstein's applied not only to tetany (carpopedal spasm), but also to the allied conditions, idiopathic convulsions, laryngismus, etc.

That tetany is much more common in artificially-fed infants had long been known, and that removal of milk from the food and placing the child on a purely carbohydrate diet has the effect of relieving the spasmodic condition, is a recognized clinical fact, but any attempt to further reduce the possible causes by dietetic experiment has, so far as the writer knows, never been previously attempted.

Although the statement of Finkelstein has been accepted and often repeated, very little effort has been made to verify it.

In confirmation of this statement, Helbich<sup>2</sup> mentions a case in which he thinks that probably the whey is responsible for the occurrence of symptoms of "tetanie" (laryngospasm).

Without having previously read Finkelstein's statement, I decided to determine what effect, if any, the removal of the salts and especially the calcium from the food would have upon the cases of infantile tetany. This suggested itself to me because of the recent tendency in literature to connect in some way this disorder with a disturbance of calcium metabolism, the exact nature of which had and still has escaped our knowledge.

Though the following observations fall far short of proving any relation between infantile tetany and the calcium content of the food, they tend, I think, to confirm the statement of Finkelstein and may be of some value, as will be discussed later.

Before going further, it might be well to make clear that by



certain German writers, and especially Escherich,<sup>3</sup> the word "tetany" refers not to the carpopedal spasm, with its accompanying phenomena, but to a group of cases designated spasmodic diathesis, in which are included idiopathic convulsions, laryngismus, rotary spasm, etc. Characteristic of this group is that with the galvanic current the cathode opening contraction of the muscle (usually tested on median nerve) requires less than 5 milliamperes of current (Thiemich).<sup>4</sup> v. Pirquet<sup>5</sup> has shown that the same holds true for the anode opening contraction. In other words, infantile tetany, as the term is used in this country, is one of a group of symptoms found in a condition of hyperirritability of the peripheral nerves. Since sufficiently accurate electrical apparatus was not at my disposal, I have chosen from this group the rarest and yet the most fitted for the observation of the effect of treatment, since the condition of carpopedal spasm is a rather chronic one, and not so much inclined to occur in paroxysms followed by latent periods as are convulsions and laryngismus stridulus.

The following cases are reported in their chronological order:—

CASE I. Arthur McLaren, aged eighteen months, entered Provident Hospital February 4th, 1908, with the following history:—

Full term child; normal delivery. Father and mother well. Breast-fed until the middle of last December. A day after taking off breast baby had a convulsion. One week after that baby had twenty-five convulsions in twenty-four hours, and had never had any convulsions since. Previous to these attacks child had attacks of dyspnea. Up to day before entrance child had vomited almost everything he ate, and refused nourishment. Child accustomed to eating all food before taken ill. In the last twenty-four hours child had taken two cups of milk.

*Examination.*—Head large and square. Anterior fontanel still open. Slight coryza and pharyngitis. Tonsils enlarged. Child has dyspnea and gives a crowing sound on inspiration. Large squeaking râles in right lower lobe. Spleen enlarged, also liver. Skin flabby and pale.

On day of entering the temperature ranged from 96.2° to 100°F. The child was given 20 ounces of skimmed milk, 12 ounces of barley water in four feedings of 8 ounces each. Two grains of chloral hydrate morning and evening were given by

rectum, and colonic flushing in the morning. Between one and five the child had almost continuous convulsions, accompanied by laryngismus stridulus. On the fifth day the food was changed to 32 ounces of barley water sweetened with 1 grain of saccharin. The chloral hydrate continued in the same amount. On this food the convulsions disappeared; the croup continued. Temperature about the same. Two soft, brown bowel movements.

On the sixth day the food was continued in the same way, likewise the chloral hydrate. In the morning the child had two convulsions. Otherwise continued the same, temperature coming down to normal. White blood cells, 17,200. Urine negative.

On the seventh day temperature normal. Feeding curds of 1 pint of skimmed milk, 1 quart of barley water sweetened with 1 grain of saccharin. On this day the child showed distinct Chvostek and Trousseau signs. Tetanic conditions of hands and feet. Temperature normal. No stools. Chloral hydrate continued.

On the eighth day the food was the same. Child better. Chvostek signs disappearing. The tetanic conditions of the feet much better. Chloral hydrate continued.

Ninth day, temperature normal. Chvostek signs present. Feet much better. Chloral hydrate given in same amount.

Tenth day, conditions practically the same. Chloral hydrate same.

On the eleventh day, chloral hydrate, grains 2, morning and evening. Condition the same. Temperature normal.

Twelfth day, chloral hydrate discontinued.

Fourteenth day, child was given a little egg, 4 ounces of lemonade, in addition to the bottle.

On the seventeenth day the food was increased to curds from pint of whole milk added to 32 ounces of barley water sweetened with saccharin. Child made an uneventful recovery. The food was given as follows:—

On March 2d he was given three feedings of curds and barley water, one feeding consisting of 5 ounces of whole milk, 3 ounces of barley water.

On the seventh, two feedings of curds and two feedings of milk and barley water.

On the tenth, one feeding of curds of milk and barley water and three feedings as above.

On the fourteenth, the child was placed on four bottles of milk, given 20 ounces of whole milk and 12 ounces of barley water.

On the sixteenth,  $\frac{1}{2}$  ounce of milk sugar was added.

On the twentieth the child was given two feedings of oatmeal gruel.

The child never had a recurrence and remains in excellent health up to the present time.

We have here a severe case of convulsions, accompanied by laryngismus stridulus and followed by tetany. Even on removal of the milk convulsions still appeared. No convulsions occurred after the curds were added to the barley water, which was probably a result not of the addition of curds to the food, but rather of a certain action of a non-irritating diet, together with the continued action of the sedative. It would be very hard to say more of this case than that the diet given was such as not to increase the irritability, since sedatives were in use throughout. It is interesting to note, however, that the first attack of convulsions occurred on a diet of skimmed milk, even though chloral hydrate was administered, as on the succeeding days. At the end of a week the sedative was discontinued with no untoward results, and the child was gradually put on to whole milk. That the proteid (casein) had no causal relation in this case I think is sufficiently evident.

CASE II. E. Woodson, negro, aged twenty months.

*Family History.*—Father and mother alive and well. Five other children dead of summer complaint and convulsions. One living and well.

*Personal History.*—Full term; normal delivery. Nursed at breast for fourteen months. Exclusively on breast until nine months; then mashed potatoes, gravy, rice, etc. No milk nor tea. Walked since eleven months old. First tooth at eleven months; seven now. Talked at twelve months. Bronchitis twice last winter. Took sick four weeks ago, after being fed peanuts. After being given beer had a diarrhea—thirty to thirty-five stools a day. Temperature 99.5° to 102° every day. No sleep.

*Examination.*—Weight, 14 pounds and 7 ounces. Extremely emaciated and very weak. Large and rachitic head. Rachitic rosary and enlarged epiphyses. Enlarged liver. Physical examination otherwise negative. Food: Skimmed milk, 20 ounces; water, 20 ounces; saccharin,  $\frac{1}{2}$  grain, 4 x 10; calories, 220.



September 22, 1908: Child much better. Bowels moved only three times in last twenty-four hours. No vomiting. Temperature, 98.2°F.

September 23, 1908: Food: Milk sugar,  $\frac{1}{2}$  ounce added; calories, 280.

September 24, 1908: Child returns with typical tetanic hands and feet. Twitching of upper lip on tapping of cheeks (Chvostek). Urinates every few minutes. Always crying for water and something to eat. Food: Curds of 20 ounces of whole milk; water, 40 ounces; milk sugar, 1 ounce; barley flour, 1 ounce, 4 x 10; calories, 520.

September 26, 1908: Child still shows symptoms of tetany as shown above. Weight, 14 pounds and 5 ounces. Has quit taking so much water. Food: Curds of 30 ounces of whole milk; barley increased to 2 ounces; calories, 770.

September 29, 1908: Tetanic spasm in hands and feet has almost entirely disappeared. Yesterday the edema in feet disappeared entirely, but this morning slight edema. Slept well. Chvostek has disappeared.

September 30, 1908: Given also two bottles of vegetable soup.\*

October 1, 1908: Child still very hungry. Given four bottles of vegetable soup and salt.

October 3, 1908: No signs of tetany. Weight 14 pounds. Child urinates almost constantly. Did not do so before salt was added to food.

October 10, 1908: On the seventh and eighth the food seemed not to be prepared properly. Too sweet. No vomiting. Stools rather hard formed and dry. Movement of bowels twice in two days. Yellow color. Still has bad cough, especially in the morning about 4 A.M. (Laryngismus (?).) Skin scaling and rather rough. Emul. Ol. Morr. 5i, three times a day. Weight, 14 pounds, 12 ounces.

October 17, 1908: Child refused to eat yesterday. Took only crust of bread. Vomited once. Child still constipated. Stool very hard and dry. Not cross. Sleeps well. Takes medicine well; coughs a little. Very nervous. Temperature, 99°F. Weight, 15 pounds, 8 ounces. Food: Whole milk, 20 ounces;

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\* Made as follows: Handful of spinach, one large beet, and two carrots chopped fine and boiled in quart of water for two hours, strained through thin cloth and water added to make up for evaporation.

water, 20 ounces; milk sugar, 1 ounce; barley flour, 1 ounce, 4 x 10; calories, 640.

October 24, 1908: Stools yellow, soft and not too frequent. Coughs at night for one hour at a time. Vomited "phlegm" last night. Two graham crackers daily. Sleeps well at night, but restless in day time. Weight, 16 pounds, 8 ounces.

October 31, 1908: Stools normal. Child in good condition. Treatment continued. Weight, 17 pounds, 12 ounces.

November 6, 1908: Child rather cross. Stool once a day, normal. Does not take milk. Wants soup. Weight, 19 pounds.

November 21, 1908: Child very good natured. Stool once a day. Has had a bad nasopharyngitis. Has cut tooth since last seen. Weight, 19 pounds, 7 ounces.

November 28, 1908: Stools hard and dry. Nasopharyngitis keeps up. Weight, 19 pounds, 10 ounces. Child's general condition good. Child has been taking mashed potatoes, meat, gravy (bean). No fever; not cross; no râles. Perhaps cough due to irritation in throat. Inflamed tonsils.

December 5, 1908: Stool—one every other day, hard and dry, dark color. Not cross. Allowed not more than three crackers daily; none at night. Weight, 19 pounds, 12 ounces.

Seen again in May and September, 1909, and in April, 1910. All three times for nasopharyngitis, which presumably came from enlarged tonsils and adenoids. Otherwise the child seemed perfectly normal.

We have here a case of tetany which developed while the child was taking skimmed milk, and disappeared in a very short time when it was given a diet from which the whey had been removed. The use of vegetable soup (which contains a comparatively large amount of the inorganic salts), to which was added salt (NaCl), had no effect on the progress of the case. It is interesting to note in this case that the facial phenomenon disappeared before the disappearance of the tetany, in marked contrast to the following case.

CASE III. Baby Elizabeth Smith, negress. Entered Provident Hospital April 6, 1909, at the age of one year, with the following history:

*Family History.*—Father and mother alive and well. One other child alive and well.

*Personal History.*—Full term; normal delivery. Weight at birth, 10½ pounds. At breast six months. Fed at irregular in-



tervals, every two or three hours; any time that the mother thought the child was hungry. Then potatoes, gravy, oranges, etc., as much as the child would take, together with breast. Child has continually had "cold." Six weeks ago began with extreme flexion of feet and hands. Has had child in another hospital three days. Child cries all the while. Weight, 16 pounds, 12 ounces. Child given calcium lactate by mouth in other hospital.

*Examination.*—Rosary—epiphyseal enlargement. Typical tetanic condition of hands and feet. On tapping cheek, retraction of upper lip on side tapped. More marked on left side. On day of entrance temperature 102.6°F., gradually falling to 99.8°F. Chloral hydrate, grain 1, in 1 ounce of water, given per rectum. Food: Barley water, 40 ounces; saccharin, grain 1, 4 x 10; calories, 120.

April 7, 1909: Tetanic condition of hands and feet disappearing. No laryngismus. Facial phenomenon present. Temperature fell to normal on this day and no chloral hydrate given. Child vomited small amount of one feeding. One thin yellow stool. Food: Curds of 16 ounces of skim milk; barley water, 40 ounces; saccharin, grain  $\frac{1}{2}$  ounce, 4 x 10; calories, 216.

April 8, 1909: Condition same.

April 9, 1909: A very slight tetanic condition of the hands and feet. Facial phenomenon diminished in intensity. Food: Curds of 16 ounces of whole milk; barley water, 40 ounces; saccharin, grains,  $\frac{1}{2}$ , 4 x 10; calories, 360.

April 10, 1909: Tetanic condition of hands and feet disappearing. Facial phenomenon more marked.

April 11, 1909: Facial phenomenon still present.

April 12, 1909: Tetanic condition of hands and feet more marked. Facial phenomenon more marked.

April 13, 1909: Tetanic condition better, as is facial phenomenon. On this day child vomited small amount of one feeding. Food: Curds of skim milk, 16 ounces; barley water, 40 ounces; saccharin,  $\frac{1}{2}$  grain, 4 x 10; calories, 216.

April 14, 1909: Tetanic condition more marked, as is facial phenomenon.

April 15, 1909: Tetanic still present.

April 16, 1909: Tetany much better.

April 17, 1909: Tetany much better.

April 18, 1909: Tetanic condition of hands and feet disappearing. Facial phenomenon still marked.

April 19, 1909: Facial phenomenon and tetany all gone.

April 20, 1909: Child left hospital.

April 22, 1909: Tetany gone. Chvostek's sign absent. Constipated. No vomiting, hungry and a little cross.

April 23, 1909: Skim milk, 5 ounces; curds of 11 ounces of skim milk; barley water, 35 ounces; saccharin, grain  $\frac{1}{2}$ ; malt extract, 1 ounce, 4 x 10; calories, 306.

April 24, 1909: Bowels constipated: brown, hard. Mother gave enema. Cross only when hungry. Hands and feet not flexed, as formerly. Sleeps well at night. Still somewhat puffy under eyelids. No cough. Food: Skim milk, 10 ounces; curds of 6 ounces of skim milk; barley water, 30 ounces; milk sugar, 1 ounce; malt extract,  $\frac{1}{2}$  ounce, 4 x 10; calories, 476.

Given milk of magnesia, one-half teaspoonful. Given with each feeding.

April 27, 1909: One daily brown, soft stool. Still taking milk of magnesia for constipation. Somewhat cross. Appetite good; sleeps well. Food: Skim milk, 16 ounces; barley water, 24 ounces; milk sugar,  $\frac{1}{2}$  ounce; malt extract, 1 $\frac{1}{2}$  ounces, 4 x 10; calories, 428.

May 1, 1909: Tetany not present. Still constipated. Food: Skim milk, 12 ounces; milk, 8 ounces; water, 20 ounces; cane sugar,  $\frac{1}{4}$  ounce; malt extract, 1 ounce; oatmeal, 2 ounces, 4 x 10; calories, 579.

May 8, 1909: Baby very apathetic. No return of tetany. Cough worse at night. Child hungry. Bowels move once a day. Color, brown. No mucus. Weight, 15 pounds, 1 ounce. Tonsils enlarged and inflamed. Temperature, 99.8°F.

Given Emul. Ol. Morr. 3i, *t.i.d.* Food: Skim milk, 10 ounces; milk, 10 ounces; water, 20 ounces; cane sugar,  $\frac{1}{4}$  ounce; malt extract, 1 ounce; oatmeal, 2 ounces, 4 x 10; calories, 630.

May 9, 1909: Stop cod-liver oil. Nystagmus. Jerks right foot and hand. Apathetic. Temperature: yesterday, 103°F.; now, 99.8°F. Given castor oil last night. One bowel movement. Occasional loose cough. Food: Milk, 15 ounces; water, 25 ounces; cane sugar,  $\frac{1}{4}$  ounce; malt extract, 1 ounce; oatmeal, 1 ounce, 4 x 10; calories, 525.

Given brandy, 3i, in an ounce of water, every four hours.

May 10, 1909: Distinct râles posteriorly and anteriorly. Child cross. Anorexia. Vomits. Temperature, 101.8°F. Treatment: Brandy as above. Enema. Milk, 10 ounces; water, 20 ounces;

cane sugar,  $\frac{1}{4}$  ounce; malt extract, 1 ounce; oatmeal, 1 ounce, 4 x  $7\frac{1}{2}$ ; calories, 420.

May 11, 1909: Child much better. Râles still present over chest. Temperature, 100.4°F.

May 17, 1909: Milk, 15 ounces; water, 25 ounces; cane sugar,  $\frac{1}{4}$  ounce; malt extract, 1 ounce; oatmeal, 1 ounce, 4 x 10; calories, 525.

May 20, 1909: Child seems well. Weight, 14 pounds, 11 ounces.

May 25, 1909: Bowels move once a day. Normal. Seems well in every way. Is hungry. Weight, 14 pounds, 13 ounces. Given graham crackers, one-half after each bottle. Food: Milk, 18 ounces; water, 22 ounces; cane sugar,  $\frac{1}{4}$  ounce; malt extract, 1 ounce; oatmeal, 1 ounce, 4 x 5; calories, 588.

June 19, 1909: Weight, 17 pounds. Well in every way. Bowels normal.

August 5, 1909: Weight, 19 pounds, 2 ounces. Child in good condition. Three watery stools daily.

December 4, 1909: Child in good condition. Weight, twenty-three pounds.

December 6, 1909: Milk, 22 ounces; water, 18 ounces; malt extract, 1 ounce; oatmeal, 1 ounce, 4 x 10; calories, 662.

December 12, 1909: Present trouble: About four days ago baby became restless at times. This morning father noticed the fingers and toes drawn in toward the palmar and plantar surface respectively.

*Feeding History.*—About the sixth of the month a doctor told her to give the baby broth, bread and butter, potatoes, and he also changed the milk. After giving her these articles for three days she developed this present trouble.

Child entered hospital. Food: Barley water, 40 ounces; saccharin, grain 1, 4 x 10; calories, 120.

December 12, 1909: The temperature was never above 100.6°F. and rapidly dropped to normal.

December 13, 1909: Curds of 16 ounces of whole milk; barley water, 40 ounces; saccharin, grain 1, 4 x 10; calories, 360.

December 14, 1909: Hemoglobin, 85 per cent.; red blood corpuscles, 5,200,000; white corpuscles, 6,600.

December 16, 1909: Curds of 24 ounces of whole milk; barley water, 40 ounces; malted food,  $\frac{1}{2}$  ounce, 4 x 10; calories, 540.



December 18, 1909: Milk, 10 ounces; curds of 24 ounces of milk; malted food, 1 ounce, 4 x 10; calories, 690.

December 20, 1909: Curds of 32 ounces of milk; barley water, 40 ounces; malted food, 1 ounce, 4 x 10; calories, 600.

December 26, 1909: Milk, 2 ounces; curds of 30 ounces of milk; barley water, 38 ounces; milk sugar,  $\frac{1}{2}$  ounce; malted food, 1 ounce, 4 x 10; calories, 786.

December 27, 1909: Child left hospital, with no signs of tetany, but facial phenomenon still present.

December 28, 1909: After leaving the hospital the child had not slept. Refused curds. Hands and feet normal. Chvostek's signs still present.

December 30, 1909: Child takes food. General condition good. Same as on the 28th. Food: Milk, 4 ounces; curds of 28 ounces of milk; barley water, 36 ounces; milk sugar,  $\frac{1}{2}$  ounce; malted food, 1 ounce, 4 x 10; calories, 798.

January 4, 1910: Milk, 8 ounces; curds of 24 ounces of milk; milk sugar,  $\frac{1}{2}$  ounce; barley water, 32 ounces; malted food,  $\frac{1}{2}$  ounce, 4 x 10; calories, 882.

January 8, 1910: Feet and hands show no signs of tetany. Facial phenomenon still present. Constipated. Slight cold. slight pharyngitis. Weight, 21 pounds. Given Emul. Ol Morr. zii, *t.i.d.* Food: Milk, 12 ounces; barley water, 28 ounces; curds of 20 ounces of milk; malted food, 2 ounces, 4 x 10; calories, 966.

January 29, 1910: Child has night terrors two or three times a week. Are severe and last for one hour. Otherwise well. Bowel movement hard. Eruption on face (urticarial). No vomiting. Not walking. One graham cracker after each feeding. Facial phenomenon still present. Weight, 21 pounds, 11 ounces.

Glycerin suppository ordered when necessary. Food: Milk, 20 ounces; barley water, 12 ounces; malted food, 2 ounces, 4 x 8; calories, 696.

February 12, 1910: Child has laryngismus. Night terrors three times a week; Bowel movement hard, but without cathartic or suppository. Weight, 21 pounds, 14 ounces. Facial phenomenon present.

February 19, 1910: Once in a while a night attack of laryngismus. Not so bad as formerly. One stool a day—formed, soft, brown. Weight, 21 pounds, 5 ounces. Facial phenomenon pres-



ent and marked. Cross all day yesterday. Noticed nothing else.

March 1, 1910: Weight, 21 pounds, 5 ounces. Temperature, 99.4°F. Seems very well. Stool hard like marbles. At times very cross. Food: Milk, 24 ounces; barley water, 16 ounces; malted food, 2 ounces, 4 x 10; calories, 792.

March 8, 1910: Weight, 21 pounds, 4 ounces. Two stools a day. Soft, no mucus, some curds, light-brown. Food: Milk, 16 ounces; barley water, 24 ounces; malted food, 2 ounces, 4 x 10; calories, 648.

March 19, 1910: Seems to be getting an attack of laryngismus. Always stealing small bits of food. One stool a day, light-brown, no mucus; some curds. Weight, 20 pounds, 4 ounces. Temperature, 99.2°F. Facial phenomenon marked, taking up one complete side of face. No signs of tetany in hands or feet. Food: milk, 20 ounces; malted food, 2 ounces; barley, 1 ounce water, 20 ounces, 4 x 10; calories, 760.

March 22, 1910: Temperature, 99°F. Whole face twitches when tapped. No signs of tetany. Laryngismus stridulus.

March 23, 1910: Curds of 32 ounces of milk. Malted Food, 2 ounces; barley, 1 ounce; water, 40 ounces, 4 x 10; calories, 820.

March 24, 1910: Temperature, 99.6°F. Facial phenomenon confined to one side. Laryngismus stridulus just about the same.

March 26, 1910: Croup much better; in fact, nearly gone. Facial phenomenon the same. Weight, 20 pounds, 8 ounces. Temperature, 99.2°F.

April 2, 1910: Weight, 20 pounds, 14 ounces. Temperature, 99.2°F. Still has marked laryngismus. Coughs quite a little. Seems better. Facial phenomenon marked, but confined to one side. No tetany.

April 5, 1910: Stools soft—two to three a day; white or slightly yellow. Has had fever for last two nights. Facial phenomenon less marked. No signs of tetany. Temperature, 100°F.

April 16, 1910: Temperature, 98.8°F. Weight, 20 pounds, 10 ounces. Two stools a day—brown; curds; a little mucus. Facial phenomenon very slight, causing only twitching of ala nasi of same side.

April 28, 1910: Weight, 21 pounds, 2 ounces. Temperature, 98.6°F. Still shows some twitching in face. Two stools a day—brown; curds; a little mucus. Child seems well. Given graham cracker a day.

May 19, 1910: Will not take milk. Vomits milk. Two to three stools a day—yellow; no mucus nor curds. Weight, 22 pounds, 6 ounces. Temperature, 98°F. Food: Milk, 16 ounces; malted food, 2 ounces; barley, 1 ounce; water, 24 ounces, 4 x 10; calories, 676.

June 23, 1910: Weight, 22 pounds, 1 ounce. Temperature, 99.4°F. Has had high fever for last twelve hours. Vomiting; constipation; no cough.

*Examination.*—Negative, given colonic flushing. Given barley water.

June 25, 1910: Milk, 24 ounces; malted food, 2 ounces; barley, 1 ounce; water, 16 ounces, 4 x 10; calories, 844.

Child has had an uneventful physical existence since above date.

It will be noted in this case that after a long period (seventeen days) of food low in caloric value and free from whey the child was able to be gradually transferred to food containing whey and made a good recovery. It is interesting to note that on April 12th, when the amount of food was slightly increased by giving the curds of whole instead of skimmed milk, the tetany after a period of three days was somewhat increased in intensity, but rapidly disappeared on returning to the former food. In the second attack the curds of whole milk were used without any bad effect, and the same general outline of treatment was followed, *i.e.*, gradual increase of the amount of whey.

On the 19th of March, 1910, this child had a marked laryngismus, accompanied by a severe facial phenomenon. The croup soon disappeared when the whey was removed from the food, but the facial phenomenon persisted for some weeks.

CASE IV. Eddie E. Yusko, aged eighteen months, entered Presbyterian Hospital April 10, 1909. On the service of Dr. Dodson.

Few days before preceding Christmas (four months) the child was taken sick, had several convulsions, and was unconscious for about twenty minutes. His hands and feet got "crippled" since that time and his bowels are constipated most of the time. One week ago the convulsions became more numerous (every half hour), and he did not urinate for twenty-four hours. No history of cough, rash, or vomiting could be obtained.

*Previous History.*—Normal birth, full term; breast-fed all

his life. Also given cow's milk, crackers, etc. Never been sick before.

*Family History.*—Negative.

*Physical Examination.*—A fairly well-nourished boy; looks very sick and the skin is free from eruptions.

*Head.*—Of a large size and square. Scalp negative. Anterior fontanel closed. *Eyes.*—Normal; react to light. *Nose.*—A discharge, sero-sanguineous in character, is noticed. *Mouth.*—Tongue coated; pharynx injected; tonsils enlarged.

*Neck.*—Cervical adenitis.

*Chest.*—Heart normal. *Lungs.*—Coarse mucous râles are heard all over both lungs.

*Abdomen.*—Distended with gas. Liver palpable. Spleen palpable.

*Extremities.*—Both hands and feet are crippled, in a condition of marked extension. Given barley water, 4 x 10.

April 11, 1909: Curds of 24 ounces of milk; barley water, 40 ounces, 4 x 10; calories, 480.

April 12, 1909: Slight tetanic condition of the hands. Feet normal. Tetanic facies not so marked. Crying a great deal, but apparently not in pain. Stool very loose, brown, shows pinkish discoloration of diaper around edge of fecal masses. Some curds.

April 14, 1909: Tetanic condition of hands and feet still present. Bronchitis. Lips parched. Breath, bad odor. Child cross.

April 16, 1909: Condition the same. Food: Skim milk, 20 ounces; milk sugar,  $\frac{1}{2}$  ounce; barley water, 20 ounces, 4 x 10; calories, 340.

April 18, 1909: Tetany much worse. Curds of 20 ounces skim milk; milk sugar,  $\frac{1}{2}$  ounce; barley water, 40 ounces, 4 x 10; calories, 300.

April 21, 1909: Tetany much better. Lips cracked and bleeding. Slight eruption of a few abraded papules on cheeks and chin. Child looks sick. Breathes as if the larynx were constricted.

April 22, 1909: Paraphimosis. Patient circumcised by Dr. George Davis.

April 26, 1909: Bleeding from nose is noticed. Tetany worse.

April 28, 1909: Curds of 20 ounces of skim milk; whey, 20

ounces; barley water, 20 ounces; milk sugar,  $\frac{1}{2}$  ounce, 4 x 10; calories, 320.

April 29, 1909: Tetany worse. Stitches taken out. Food: Curds of 20 ounces of skim milk; barley water, 40 ounces; milk sugar,  $\frac{1}{2}$  ounce, 4 x 10; calories, 300.

April 30, 1909: Tetany better.

May 1, 1909: Given oatmeal gruel and graham crackers. Food: Curds of 16 ounces of skim milk; milk, 5 ounces; barley water, 35 ounces, 4 x 10; calories, 206.

During his stay in the hospital his temperature varied from 99° to 101° F., except on the 20th, 22d and 23d of April, when apparently due to an infected paraphimosis the temperature varied from 102° to 103° F. During the whole time the respirations were rather high, being from 30 to 40. Pulse accordingly.

*Throat culture.*—On entering, negative to diphtheria.

*Urinalysis.*—Negative.

During the first few days stools numbered one to two a day, yellowish or brown, soft or liquid. Lastly, only passed with enema.

Child died on May 2, 1909, from sudden attack of convulsions which began at eight o'clock in the morning and continued until death, at nine o'clock.

*Medication.*—On the 14th of April one teaspoonful of emulsion of cod-liver oil was given, and continued three times a day until the 16th. On the 25th two teaspoonfuls of castor oil ordered *p.r.n.* This was all the medicine except local applications of boric acid solution to the eyes and nose and various stimulants just before death.

This is a very typical example of a rather severe and chronic tetany. With surprising regularity the tetany became worse or better, according as the whey was added to or withdrawn from the food, and this regardless of the quantity of the food and of its content in fat and sugar. Death occurred at a time when nothing of the sort was expected, but was due undoubtedly to the convulsions, and is interesting to note that whey had been added to the food (5 ounces of whole milk) on the day previous. How much importance is to be given in this respect to the oatmeal gruel and graham crackers is problematical, but personal experiences and the opinion of others that the starches have no ill effects in tetany and allied conditions lead me to think that they had little or nothing to do with the result.



In looking over these 4 cases one is struck by the fact that a food containing no whey should be so non-irritating, and that with such a striking regularity there is seen an increase in the tetanic condition on the addition of whey to the food. It seems to me that one is justified in drawing the conclusion that the curds of milk from which the whey was removed were not irritating in these cases. Before we proceed further in the discussion of the action of whey, it would be well to state briefly in what way the food was prepared. In the 4 cases mentioned the food was simply a mixture of curds of skimmed or whole milk, as indicated, which had been precipitated with rennet, mixed with barley water. This arrangement proved very unsatisfactory, for the reason that curds would precipitate to the bottom of the bottle and oftentimes fall into large clumps, which it was impossible to get through the hole of an ordinary nipple unless this were enlarged. After some experimentation, especially with gelatine in various concentrations, I found that a solution of arrowroot flour to the strength of two drams and a half (a level tablespoonful) to the quart makes the best medium in which to keep the curds suspended. It is very necessary that the curding be done carefully. The following method has been used in the Provident Hospital diet kitchen with greatest success: The milk is brought to a boil and then cooled to 107°F. Chymogen, a teaspoonful to the quart, is then added and the temperature kept at 107°F. for half an hour. The milk is then strained through a cheesecloth and allowed to drain for one hour. The curds are then put through a finely meshed sieve.

It would seem that the whey was an irritating food in these cases. If this be true, we must first look to its composition and then to various other experiments to determine what constituent is most likely involved.

Holt<sup>6</sup> gives the following analyses of whey:—

	46 Analyses. (Whole Milk.) Fat Free Milk.		
	Koenig.	Adriance.	Adriance.
Proteid .....	.86	.94	1.17
Fat .....	.32	.96	.04
Sugar .....	4.79	5.49	5.36
Salts .....	.65	.48	.52
H <sub>2</sub> O .....	93.38	92.13	92.91

We see that the whey contains albumin (casein and lactal-

bumin), sugar and ash. Other constituents, such as the ferments and the non-proteid nitrogen matter, being either so small in amount or of such a doubtful nature, can, I think, safely be disregarded. Of the albumin one can scarcely think that the casein is to blame, since it has been used in large quantities in the feeding, as shown, and has caused no disturbance. We therefore have only the lactalbumin to consider. It is a well-known fact that denaturized albumins seem to have no toxic effect upon the organism. The lactalbumin undoubtedly is denaturalized by the action of the gastric and intestinal juices before reaching the blood. That the end products of albumin digestion might be the cause of some disturbance is possible, but as yet we have no reason for suspecting them.

In considering the sugar it might be said that in cases where tetany has been produced by removal of the parathyroid gland an acidosis has been noticed, as is evidenced by the increased ammonia excretion in the urine. This acidosis, however, does not react to sodium bicarbonate in the manner that the acidosis produced in a diabetes mellitus does, as is shown by MacCallum and Voegtlin.<sup>7</sup> So that it seems hardly possible, considering the fact that carbohydrates have always been regarded as non-injurious in these cases, to blame the sugar for any such action.

We come now to the salts. The principal salts to be considered are those of calcium and magnesium, sodium, potassium, chlorine and phosphorus. Of these, the calcium is the one which has brought out the largest amount of investigation.

In 1905 Quest<sup>8</sup> examined the brains of 12 children, of which 3 were spasmophilic, as to their calcium content. He found in the brains of the three spasmophilic children that the calcium content was distinctly reduced. He later fed calcium-poor food to dogs and got an increased electrical irritability. In these dogs the brains lost no calcium, nor could he produce any healing effect in tetany by the use of calcium in the food. He suggests that phosphorus may be in some way to blame.

Many experiments have tended to confirm the idea of Quest, which he recently has repeated,<sup>9</sup> that spasmophilia is the result of a deficiency of calcium in the system.

Recently Rosenstern<sup>10</sup> has produced a marked reduction in the electrical irritability in spasmophilic children by giving once in twenty-four hours 100 c.c. of a 3 per cent. calcium chloride solution by mouth. This reaction was brought about with the

use of other calcium salts and it seemed to him that by the use of sodium salts the condition was made worse rather than better.

The metabolic experiments of von Cybulski<sup>11</sup> and Schabad<sup>12</sup> tend to show that there is at least no decrease in the calcium retention, or, rather, no increase of calcium excretion during the period of spasmophilia. Schabad undertook the examination of the excreta in rachitic children with spasmophilia. He comes to the following conclusions:—

“(1) The calcium and phosphorus metabolism in rickets complicated by tetany is not distinctly different from the metabolism in uncomplicated rickets.

“(2) The improvement of the tetany, that is, a lowering of electrical irritability, under the influence of phosphorus and cod-liver oil, goes hand in hand with the improvement of the calcium retention; that is, a recovery from the rickets.

“(3) The addition of calcium salts in spite of their resorption does not in a recognizable manner aggravate the condition of tetany.

“(4) The hypothesis of Stöltzner concerning the importance of calcium stagnation in the organism in the etiology of tetany is not justified in fact.”

We now come to the other side of the question, which is upheld by Stöltzner.<sup>13</sup> He believes that the cause of tetany is a calcium stagnation in the tissues. In his experiments<sup>14</sup> he found no appreciable difference in the electrical irritability in dogs fed with calcium-poor and calcium-rich food. Stöltzner's work has found new adherents and has not been substantiated, so far as I am able to determine, by any subsequent experiments by himself or anyone else, unless we regard those of Cooke<sup>15</sup> as upholding these ideas.

Recently MacCallum and Voegtlin have injected calcium salts subcutaneously in animals from whom the parathyroids had been removed and which were in fact in a state of tetany. One cannot well give a complete summary of what has been done without referring to this article, although it has no direct bearing on the question at issue. The experiments undertaken by MacCallum and Voegtlin were to determine the action of calcium and calcium salts in tetany produced by the removal of the parathyroid glands. That this tetany has any direct connection with infantile tetany has never been proven. MacCallum and Voegtlin, among other things, come to the following con-



clusions: That the withdrawal of calcium salts leaves the nerves in a state of hyperexcitation. The injection of solution of calcium salts in animals with tetany checks all symptoms. The injection of magnesium salts probably has similar effect. The injection of sodium or potassium tends to the opposite.

In the study of metabolism of their thyroidectomized animals the following was noticed:—

“(1) A marked reduction in the calcium content of the tissues, especially the blood and the brain, during tetany.

“(2) An increased output of calcium in the urine and feces on the development of tetany.

“(3) An increased output of nitrogen in the urine.

“(4) An increased output of ammonia in the urine, with an increased ammonia ratio in the urine.

“(5) An increased amount of ammonia in the blood.”

The acidosis was not affected by the use of sodium bicarbonate.

In concluding, they say: “In general, the rôle of calcium salts in connection with tetany may be conceived of as follows: The salts have a moderating influence on the nerve cells. The parathyroid secretion in some way controls the calcium exchange in the body. It may possibly be thought in the absence of parathyroid secretion substances arise which can combine with calcium abstracted from the tissues and cause its excretion and that the parathyroid secretion prevents the appearance of such bodies. The mechanism of parathyroid action is not determined by the result. The impoverishment of the tissues, with respect to the calcium, and the consequent development of hyperexcitation in the nerve cells in tetany is proven. Only the restoration of calcium to the tissues can prevent this. The explanation is readily applicable to spontaneous forms of tetany in which there is a drain of calcium for physiologic purposes, or in which some other condition causes a drain of calcium. In such cases the parathyroid glands may be relatively sufficient.”

We will further on discuss the question of the parathyroid glands and their action in connection with tetany. It would seem, then, that the consensus of opinion is that tetany is caused by a depletion of calcium from the system, and that recovery can be best produced by supplying this calcium.

In considering the other salts we may say that the magnesium



probably acts as the calcium does. Cooke, however, in the brains of two dogs who died of tetany after removal of the parathyroid glands, found that the calcium content of the brain was increased, but the magnesium content uninfluenced. This is the only reference to the action of magnesium salts in this regard, aside from that of MacCallum and Voegtlin, already quoted, which I can find. It has ordinarily been supposed that the action of calcium and magnesium is very much the same. The works of MacCallum and Voegtlin, Rosenstorn and of Schabad tend to give the idea that the sodium and perhaps the potassium salts act in an irritating manner in cases already having tetany or predisposed to it. Further experiments in this way will be necessary.

The chlorine as yet has not been investigated, except in connection with the calcium and sodium salts. Here it has seemed that the effect on the tetany was caused wholly by the basic principle in the salt, since a change of acid radical seemed to bring about no different results.

Interesting in respect to the phosphorus is the work of Schabad, who found the electrical irritability increased and the calcium retention decreased when phosphorus alone was added to the food. However, when phosphorus and cod-liver oil were added the electrical irritability immediately diminished and the calcium retention was very markedly increased. The action, however, of phosphorus and cod-liver oil in respect to the electrical irritability was not as distinct as was the action of the calcium salts, and the calcium phosphate showed no better results in this respect than did calcium acetate or calcium citrate. It would seem from this, if we may draw conclusions from such a small number of experiments, that the phosphorus has shown itself to be of very little etiologic value in this condition. At least we may say that with our present knowledge phosphorus is not irritating in tetanic conditions. It would not be proper to discuss the question of infantile tetany without giving a few thoughts to the idea that derangements of the function of the parathyroid gland are responsible for this condition.

Escherich, who has done so much work in this condition, regards disturbance of the function of the parathyroids as the etiologic factor in these cases. He bases his opinion upon the work of Yanase,<sup>10</sup> who examined the parathyroids of children suffering with tetany. He found in these cases hemorrhages or

scars from hemorrhages. His findings are in accord with the so well-known work of the Johns Hopkins school in respect to the etiology of tetany of the adult, in which they have so conclusively proven that the parathyroid plays a very important part.

We now come to the discussion of the bearing of our cases on the various theories so far advanced. The objection to the theory of Escherich is that tetany rarely occurs in the first weeks of life. If tetany were due to a lesion of the parathyroid gland which occurred at birth, why do the symptoms of tetany appear so late? Again, is it not possible that the true cause of the disturbance lies in a derangement of metabolism, over which derangement the action of the secretion of the parathyroid glands has influence, but which cannot be entirely suppressed by their action? Although it is possible in animals to produce tetany by removal of the parathyroids, still this must needs be in connection with the taking of food. MacCallum and Voegtlin state that, after removing the parathyroids, dogs occasionally develop tetany, even though fasting, which would seem to show that there is some distinct connection between the taking of food and the development of tetany, and would give one the idea that the parathyroid glands acted only secondarily in the production of this condition; that the primary factor lay in the metabolism.

So far as we are at present able to determine, it is the salts which are most to be blamed in this respect, and of all these calcium is the one which has received the most attention, and it is to the derangement of Ca-metabolism, to which it is most likely that tetany may be ascribed. We must always bear in mind, however, that inorganic salts in the body may act in two ways—either chemically, in which they enter directly into the metabolism of the body, or pharmacologically, in which they act as any other drug. It would seem from experiments that calcium in small quantities would not tend to reduce the irritation, but that in large quantities the action was that of reducing the irritability of the peripheral nervous system. Whether this action is pharmacologic or chemical is as yet unproven, but the probabilities are that the action is a chemical one. It is very hard to explain the fact that in the 4 cases here reported the removal of whey, that is, the removal of a large proportion of salts, from the food should act in a non-irritating way. It will be re-

membered that one of these cases had its tetany for several days before entrance to the hospital, in spite of the fact that calcium lactate was given by mouth, and that very soon after its entrance the tetany began to get better and quickly disappeared. If tetany is due to a lack of calcium in the organism, and if tetanic conditions improve on a food which is low in calcium, then we may only conclude that the calcium which is in the food is much better utilized and that the calcium in the body is retained, and that, in other words, whey contains some constituents about which we know nothing which cause a removal of the calcium from the system. Unhappily, it has been impossible to do metabolic experiments on the cases here reported. Such would have been of a great deal of value.

Since the body of this article was written there has appeared a report by Nothmann<sup>17</sup> on some experiments carried out by him. He determined the calcium quantity in the blood by means of Wright's method, which consists in the estimation of the amount of calcium in the blood by testing the coagulability in the presence of the oxalates. This is done in the following manner: Various quantities of concentrated solutions of ammonium oxalate in physiologic salt solution are used, with which like quantities of blood are mixed, the amount of calcium being determined by the concentration of the ammonium oxalate solution. He found that the calcium values as thus determined did not depend upon the amount of calcium ingested. In other words, an increase of the amount of calcium in the food did not produce an increase in the amount of calcium in the blood. On the contrary, he found that the increase of calcium in the food was often accompanied by a lowering of the calcium content of the blood. He also found that in tetany the blood was relatively poor in the calcium combinations with the ammonium oxalate. A like condition was present in animals from which the parathyroids had been removed. In proving the method he found that the results obtained in this manner tallied very well with those obtained by examining the calcium content in large quantities of blood.

If Nothmann's experiments may be interpreted in the manner in which he suggests, and this seems very probable, there is here, then, an explanation for the results which I have obtained in this treatment of tetany.

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In concluding, we may say that whatever the direct cause of tetany may be, that it is intimately connected with metabolic processes, and that there is in the whey some material which acts in an irritating manner, producing an increase of the irritability of the peripheral nerves. That removal of whey from the food gives a food which is non-irritating in these cases, but which frequently must be supplemented with sedatives in order to bring about a proper reduction of the spasmophilic condition.

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DEMONSTRATION OF THE DIPHTHERIA TOXIN IN THE BLOOD.  
 —Aaser (*Berlin. Klin. Woch.*, November, 1911) has experimented with Römer's diphtheria cutaneous reaction and is able to vary the claims put forth. In a boy aged ten years with toxic diphtheria who had received 8,000 units of antitoxin an attempt was made to determine whether or not the toxin was still circulating in the blood. Some of the latter, withdrawn before the injection, was centrifuged and its serum injected into the skin of guinea-pigs in various quantities. The characteristic necrosis developed. Some sixty hours after antitoxin injection the test was repeated and proved negative throughout. In a second case, which ended fatally, it was correspondingly shown that neutralization had not occurred. The first onset had yielded but more toxin was evidently formed in the throat and the subsequent attempt at neutralization proved incomplete.—*Medical Record.*



## THE RELATION OF SOCIAL AND ECONOMIC CONDITIONS TO INFANT MORBIDITY AND MORTALITY.\*

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Man cannot live on bread alone. Infants do not thrive on milk alone, even the very best. "Good mothering" is the spiritual in the infant's life, the magic force that, at times, makes the infant of the tenement richer than the infant of the palace; that keeps alive the infant of the crowded, filthy slum while that of the immaculate, scientific hospital so often dies. Many years ago Jacobi was compelled to resign from an infant asylum for explaining this to his lady board of directors.

By "good mothering" I mean only two things—a healthy inheritance and maternal nursing; all else is secondary and either does or can be made to accompany these two conditions. Without these all suggested solutions of the problem of infant mortality are but emergency measures, makeshifts.

An analysis of infant deaths by age incidence shows the importance of conditions existing before and at birth. One-third of all deaths in infants under one year of age occur before the baby reaches the age of one month. This is a universal experience, true in places of low mortality and high mortality, slightly less in country than city. In Newark 67 to 80 per cent. of these deaths are ascribed to convulsions, diarrhea, debility and immaturity, and 50 per cent. to debility alone. This, too, is the universal experience.

These deaths, more accurately speaking, are due to three distinct groups of factors, which we may define as antenatal, neonatal and postnatal environments.

The antenatal environment of the fetus is the blood of the mother. Congenital deformities, congenital debility, still-births and early deaths depend in no small way on the conditions in the mother's life that have made her blood toxic to the fetus or so impoverished that it cannot properly nourish it. Among preventable social and economic conditions that have such an in-

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\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Spring Lake, New Jersey.

jurious affect on mother and child the most important are syphilis, overwork, underfeeding and toxemias from special trades. Syphilis alone is the admitted cause of most abortions and still-births, and unquestionably is the real cause of many deaths ascribed to debility, immaturity and diarrhea. Therefore, all anxious to reduce infant mortality must join the fight on the social evil. Every mother must be given a chance at least of saving herself and unborn child from this devastating and mutilating disease. Overwork, insufficient food and special toxemias from lead, alcohol or mercury should be grouped together, as they are all the result of that economic maladjustment that compels or even permits married women to work away from home, and particularly in factories. Pinard, of Paris, found the average weight of 500 infants whose mothers worked up to the day of their confinement to be 3,000 grams, of 500 whose mothers spent the last months in the hospital 3,290 grams, of 500 whose mothers spent the whole time in the hospital 3,369 grams. Low diet in the mother reduces the infant's weight by 10 per cent., and one-half of those mothers whose infants die of immaturity or debility are in poor health, undernourished and overworked. But this overwork and poor health effects our problem in still a more serious way. The mother who is overworked, underfed, worn out and irritable cannot nurse nor care for her baby properly. Even if she remains at home after the confinement much permanent damage has been done to the infant and mother, and infant deaths will continue as long as this maladjustment remains.

Lead poisoning is more extensive than we have supposed, its effects on mother and child more profound than we have thought. Among lead workers some 22 women had 112 pregnancies, with 55 abortions and 4 still-births; 36 of the infants died before they were one year old, leaving at the end of one year 16 living children, of whom many died before they reached the age of three. Fifty per cent. abortions and 68 per cent. mortality in those born alive. This is not to be ascribed entirely to the lead poisoning, as this kind of work leads to irregularities of all kinds in eating, drinking and living, but it can be charged to the conditions that compel married women to work in factories and poisonous trades. It is necessary here to emphasize the bad effects of these many pregnancies and abortions on the mothers; surely they have neither the health nor the courage to give their

babies "good mothering." Will you say it is because they are shiftless, ignorant, lack maternal instinct, do not feed their babies properly? Would it not be more true to say that on account of a peculiar shortsightedness in our social and political leaders, a peculiar maladjustment in our economic world, we permit our mothers to labor and starve to bring forth congenitally weak and diseased infants?

The environment of birth is especially important in this very group of infants, the congenitally weak and congenitally diseased, and in just this group it is apt to be the worst. These women are usually delivered by midwives, not by choice, but because it is the only care they can afford to have. How many deaths result from improper care at birth is hard to estimate, but we know that unnecessary exposure, rough handling and the improper care of a weak infant in the neonatal period—that first week when the infant is trying to adjust itself to its new environment—is the real cause of many of these deaths. The death certificate may read diarrhea—sepsis may have been more accurate. We must make provision for the better care of infants at and immediately after birth.

Still, the postnatal environment is the most important of the three, and in this, one element is of such paramount importance that when it is present all else is of little moment. I refer to maternal nursing and the mothering that goes with it. Ten times as many bottle-fed babies die than breast-fed; even at milk depots there is an admitted mortality of 6 per cent. The benefits of nursing are not only those that come from a proper food. Comfort and happiness, care and attention add to the well-being of the infant as to that of the adult, and no one can give this like the mother.

Two questions present themselves: Are mothers able to nurse? and, Are mothers the best caretakers of their babies? I will dispose of the second question first. It should never have been asked, but I have heard headworkers at day nurseries and some philanthropists intimate that the best place for a baby was a day nursery, away from its dirty home and ignorant mother. Phillips, formerly of the New York Milk Commission, answers this question in this fashion: "Even in the poorest and most squalid home the mother is abundantly able to care for her baby provided she is given some instruction."

The first question, Are mothers able to nurse their babies? is



vital to the issue. If mothers are not able to carry out this function then we must devote our whole attention, as most physicians and philanthropists really are doing to-day, to the question of a proper milk supply and modification for infants; but if mothers are able to nurse and do not we must bend all our efforts to the removal of all obstacles to the carrying out of this natural and important function.

The impression is about that women do not nurse as much as formerly. This may be true, especially among the rich, but it is not true that mothers cannot nurse their babies to the extent that more than 60 per cent. of the babies must depend on artificial feeding for sustenance. Mme. Dluski, of Paris, in a thesis on maternal nursing, declared that among 100 women that were healthy and receiving proper food and rest 99 could nurse.

Of 25,865 children under nine months reported by the summer corps in 1907 in New York, 81.5 per cent. were reported as breast fed and 18 per cent. bottle fed.

Kriege and Seutman determined that in Berlin, in 1905, on a certain day in August 94 per cent. of the babies had been nursed one month, 86 per cent. from two to three months, 77.9 per cent. from five to six months. Schwarz found among 780 babies under personal observation from birth at a maternity clinic that 96 per cent. were on the breast one month, 91 per cent. two months, 89 per cent. three months, 85 per cent. four months, 80 per cent. five months, 75 per cent. six months, 68 per cent. seven months, 67 per cent. eight months, and 65 per cent. nine months. If 90 per cent. of the poor mothers are able to nurse at least three months, it is our duty to find out why so many do not do so.

Spargo tells of a woman who returned to the factory on the seventh day after the birth of her baby. In this one case can be found the whole sad tale of infant neglect, infant death.

The highest infant mortality rate of any people or race is among the negroes, and in no race are there so many married women at work in factory or field, north or south, east or west. In all cities of the United States, large or small, industrial or agricultural, the percentage of married colored women at work is about the same. In such widely separated and different cities as Atlanta, Ga., Newark, N. J., Baltimore, Md., Boston, Mass., Chicago, Ill., Louisville, Ky., Washington, D. C., Cincinnati, O.,



one-third to one-fourth of the colored women at work are married, while one-ninth to one-twelfth of the foreign born white women at work are married. And so we find that the mortality in colored infants is practically the same throughout the United States, in city or country, in cities with low or high infant mortality.

The infant mortality rate in Cincinnati in 1900 was 174.3, colored, 246.5; in Newark 160, colored, 374.3; in Kansas City 186.8, colored, 312.9.

Among the whites in the country fewer married women work than in the city and the infant mortality is lower, but 77 per cent. of the negroes are in the country districts and their infant mortality is not only so much higher than that of the whites, but it is often highest in the country districts. The difference in the social customs and economic status of white and colored families is the only satisfactory explanation of this fact. The whites stop work during the child bearing period, while the negro women must keep right on. The foreign born white woman is even less apt to work after marriage than the native born, and the infant mortality in the same city is highest among the negroes and lowest among the foreign born. In 1900 in the United States there were working between the ages of sixteen and twenty 56.8 per cent. foreign born and 49.6 per cent. colored women; between the ages of twenty-five to thirty-four 41.5 per cent. foreign born and 45.6 per cent. colored women; between the ages of thirty-five to forty-four 19.8 per cent. foreign born and 41.8 per cent. colored women.

The effect of the percentage of married women at work on the infant mortality can be shown by comparing large areas that have many factors in common: New Hampshire and Michigan have about the same density of population, the same percentage of foreign population, the same percentage of urban population, but New Hampshire has an infant mortality rate of 172, and 20.4 per cent. of its women at work are married, and Michigan has an infant mortality rate of 121.3, with only 3.1 per cent. of its women at work married.

The highest infant mortality rates are found in those cities that have mostly industries that offer employment to unskilled female labor, the kind of factory work married women can easily attempt. Wherever we find a textile town, one in which the main industries are the manufacture of cotton goods, woollens,

silk, there we find the greatest number of married women at work and the greatest number of infant deaths.

The textile towns are in Massachusetts, Rhode Island, New Hampshire, a few in Maine, New Jersey and New York. They differ in density, population, general death rate, milk supply; they are similar in their high infant mortality rates and the large number of married women at work.

Biddeford, Me., 311.6, Fall River, Mass., 304, Laconia, N. H., 261.2, Troy, N. Y., 229.5, Lansingburg, N. Y., 230, Passaic, N. J., 227.9, Woonsocket, R. I., 233. But, it may be argued, in the South there are very few factories and still the infant mortality is high in city and country; in Mobile, Ala., 271, Charleston, S. C., 322.7, Atlanta, Ga., 306, Alexandria, Va., 250, Annapolis, Md., 233.5. Here, however, one-half of the population is colored, of whom one-half of the married women are working in the fields and in cotton goods during the child-bearing period.

We could multiply statistics showing that in city or country, among white or colored, native or foreign, in cities of good or bad sanitation, in cities or states of great or little density, of good or poor milk supply, with or without milk depots, the high infant mortality rate is found in those places that offer factory employment to women and where the largest percentage of married women are at work, where social and economic conditions make for poor health in the mother, and the nursing and care of the infant impossible. This is very convincingly illustrated by a study of conditions in England during our Civil War, when on account of their inability to obtain cotton the textile towns were without work and the women compelled thereby to remain at home. Most of them were suffering from privation, but they nursed their babies with the result that in Lancashire in 1861 the rate was 184, in 1862 it was 161, and in 1866, when the mills were again running and the women at work, it was 200. In Paris during 1870-1871 the general death rate doubled while the infant mortality rate was reduced 40 per cent.; a practical demonstration that the infant's environment is limited almost to one factor—maternal nursing—when this is present, ignorance, crowding, poor ventilation, illiteracy, seem to be of very little importance. In a little town in France a wise and philanthropic manufacturer reduced the mortality 40 per cent. by not allowing women to return to work till their babies were at least two months old. The cities of low mortality show the opposite pic-

ture. They are found where the main industries are mining, smelting, foundries, lumbering, building of cars, wagons and furniture, in short in places where women cannot find employment. The living conditions in Pennsylvania are as bad as in any part of the United States, and still the infant mortality is lower than in Massachusetts. The lowest rates are in the Western states, the centre of heavy industries: Portland, Ore., 92.3. Salt Lake City, 82.9, Helena, Mont., 50, Minneapolis, 95.2.

It has often been shown that the percentage of infant deaths among the poor was much greater than among the rich; in Paris in the rich quarter the rate was 134, and in the poor quarter 313. In New York among families with an income of \$5 or less the rate was 236, among families with an income of \$6 to \$10 the rate was 124, among families with an income of \$11 to \$15 the rate was 102, among families with an income of \$15 and over the rate was 65. This is merely giving the reason for the bad antenatal, neonatal and postnatal environments; it represents lack of food, overwork before the birth, insufficient care at the birth, factory labor and neglect of the infant after birth.

When we study this question among the native and foreign born this same factor seems to be the controlling element. In New Jersey the infant mortality rate among the native born is 146.1, among the foreign born only 93.3, in Newark among the native 177, the foreign 131.5. But this low rate among foreign born is not due to any national vitality, for in cities that offer employment to foreign married women the rate is higher than among the native. In Fall River the rate among the native born was 184, and among the foreign born 192.8, in Passaic among the native born 165.7 and among the foreign born 189.

Some claim that the crowding, congestion, uncleanness found among the poor is in some way responsible for their high infant mortality. It is easy to show that the size of the city and the density of its population bears no constant relation to its mortality; London has a lower infant mortality rate than Newark. But not even crowding in tenements bears any very definite relation to infant deaths; in Hoboken, where the infant mortality rate is 198, more than 12 per cent. of the families live in dwellings holding at least eight families, while in Fall River with a mortality of 304, only 1.1 per cent. of the families live in dwellings holding at least eight families.

Besides such a social and economic adjustment that each



mother may remain in health, give birth to a vigorous infant, and nurse and care for her own baby, a certain amount of practical knowledge about the care, nursing and feeding of infants is necessary before we can expect to reduce infant mortality to its proper place. This knowledge is not so essential among breast-fed babies as bottle-fed, but here too it has a marked influence in preventing serious illness and death. Neither literacy nor general intelligence is any guarantee that the mother has this concrete knowledge, and often the illiterate make better mothers, from this point of view, than the well-educated. When women will know as much about the nurturing of infants as some know about the care and growth of plants and animals, when the educational departments of our cities realize that a correct knowledge of motherhood and babyhood is of more value to our race than higher mathematics, a long step will have been taken toward reducing infant sickness and death. Specific instruction to mothers has been shown to have an immense value in increasing the number of women nursing and decreasing the infant mortality of the whole city. Budin showed that very few babies died among the mothers who attended his consultations, where they received nothing but advice and encouragement. In England in 1909 a study was made of seventy-six towns that were trying to reduce their infant mortality rates by various methods; those that gave their whole energy to making maternal nursing possible, encouraging and regulating it, to instructing mothers in the proper care and feeding of artificially fed babies, showed the greatest reduction; those that relied on the establishment of milk depots and the distribution of modified milk did not have as marked an effect on the city rate.

In the face of these facts the excessive infant mortality must be designated a socio-economic problem; it cannot be claimed that it is entirely dependent on contaminated milk supplies and special methods of modification. No one knows the extent of infant morbidity and mortality better than the physician, no one feels more keenly the worry and grief, the awful waste in time, energy and money these many deaths entail, no one is so anxious to bring the sovereign remedy that will make an end of this slaughter of the innocents; but the physician must go beyond diarrhea and milk, if he would be master of the situation. The diarrhea is the end of a long chain of maladjustments, contaminated milk but one link. The physician must make clear to the



world that the preservation of human life is as important as the preservation of forests that in dollars and cents every infant's birth and death has been a loss of at least \$50, that less than this properly invested could have prevented this death. We must give every mother a *chance* to do what we all admit would solve our problem—nurture and care intelligently for her own baby. In New Jersey, in 1909, there died under one year of age 7,293 babies. Fisher, conservatively, estimates that 47 per cent. of these deaths were preventable, so that there was an unnecessary loss of 3,500 infants. Each baby was worth at least \$50, making a preventable loss of \$175,000! If \$175,000 was lost annually in hogs, the whole federal government would come to our aid.

If we would solve the problem of infant mortality, we must write a new declaration of independence wherein it shall be set forth that every infant has an inalienable right to health at birth, proper care at birth, and to its own mother after birth, and that anything that prevents this is, in the words of John Burns, "an individual mistake, a communal blunder, a social tragedy."

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BREAST FEEDING.—E. C. Pritchard, H. R. Carter and W. O. Pitt (*Lancet*, September 2, 1911) have by means of accurate scales determined in a large number of infants the amount of breast milk obtained at each feeding. This amount is designated a "test-feed." The latter is a most valuable aid to the diagnosis of the ailments of breast-fed infants. It is mere guesswork to attempt to treat cases of this kind unless one knows how much milk the infant is receiving. Infants are often brought to the clinics who have been treated by drugs for constipation when the sole cause of the condition is starvation. Again, infants are often given supplementary feeds of cow's milk in amounts of 4 or 5 ounces when the test-feed proves that the amount they obtain from the breast is about 1 ounce—sometimes less. Under such conditions it is hardly surprising that cow's milk is found to disagree. As an aid to diagnosis and for accurately adjusting the amount of food given in supplementary feedings, or at the time of weaning, the test-feed soon becomes absolutely indispensable to those who have had experience of its advantages.—*Medical Record.*

## IS THE MILK OF ECLAMPTIC MOTHERS TOXIC? CASE REPORTS.

BY CONWAY A. FROST, M.D.,

Utica, N. Y.

In the January number of the ARCHIVES OF PEDIATRICS appeared an extremely interesting article by James R. Goodall entitled, "Should eclamptic mothers nurse their newborn?"

It was particularly interesting to me, as it had been my custom to consider the milk of eclamptic mothers toxic. For the past ten years I have been particularly careful not to allow nursing until the albumin in the urine of eclamptic mothers had begun to decrease; forbidding nursing entirely if the convulsions were severe and the urine showed marked albuminuria.

The following cases appeared interesting to me as confirming Dr. Goodall's conclusion--the first 2 confirming his observation on the increased toxicity, where convulsions appeared postpartum, and the last 2 confirming the observation that children born of nephritic mothers were of lowered vitality.

CASE I. I was called in consultation to see a baby one week old. The history of the case was as follows: The mother's urine had been examined weekly up to the second day before confinement for albumin but not for other indications of nephritis, and no albumin was found. The labor had been difficult and forceps had been used. The child was born apparently sound, weighing  $7\frac{1}{2}$  pounds.

During the first day after delivery the mother had a convulsion and the urine per catheter was found loaded with albumin. The mother had no further seizure and an abundant supply of milk started on the third day. The child was put to the breast on the second day. Within twenty-four hours the child appeared slightly blue at the finger-tips and cold about the feet; the child continued to nurse at the breast; cyanosed condition continued. On the second day of nursing, the fourth day after confinement, the stools became green and slight twitching of the eyes was noticed. The mother's condition improved and the child was kept at the breast. On the seventh day I was called and found a general cyanotic condition of the face and extremities, respiration slow and shallow, the abdomen slightly distended,

nystagmus and slight convulsive seizures. Though artificial feeding was resorted to, all symptoms increased and the child died in two days, evidently overpowered with some toxic condition.

CASE II. I was called in consultation to see a baby two weeks old, who apparently had simply an acute intestinal indigestion of toxic origin, green stools, temperature 103°F., pulse rapid at times though irregular. The child appeared slightly cyanosed and in semi-comatose condition. No specimen of urine could be obtained. The history of the birth was slightly different from the first case. The mother had slight traces of albumin during the latter months of her pregnancy and had suffered with some headaches; she had one convulsion immediately after the birth of the child. The albumin continued and the child was allowed to nurse, as there was an abundant milk supply. Upon my seeing the child weaning was advised immediately and an attempt was made to feed artificially on whey mixture. The child had no convulsions, but a slight twitching of the head and eyelids appeared, the respirations grew more shallow and labored and the abdomen became more distended and the child died in two days.

CASE III. In 1909 a young woman, twenty-six years of age, was referred to me during her last month of pregnancy. On examination I found the urine free from albumin casts, acetone and indican; normal excretion of urea. During the last week of pregnancy traces of albumin appeared. The mother was delivered without forceps, normal labor lasting about eight hours, the child weighing 7 pounds. On the third day the temperature of the mother was slightly elevated, the mother showed signs of nephritis. I removed the child from the breast and substituted modified milk formula. As the mother continued to improve in a few days I placed the infant at the breast for four days, when again the albumin appeared in the mother's urine and I resorted to modified milk. As the child did not do very well and the mother's condition improved, I allowed her to nurse him. Two months later I was called to see the child, who appeared to have a slight spot of erysipelas on his forehead. Examination of the child's urine showed albumin and casts. The spots spread over the forehead and down on the cheeks, the urine quantity was decreased, the albumin continued to increase. On the fourth day of the illness the child became comatose with slow labored breathing and cyanosed extremities.



Though no convulsions appeared and every means at my command were employed to restore the kidneys to their normal state, the child died on the fifth day. Of course I do not know how long the nephritic condition existed prior to my examination.

CASE IV. The mother's urine was examined for albumin for three months prior to accouchement; none was found. No examination was made for two days before confinement. The labor proved long and difficult and forceps were resorted to. An hour after delivery the mother was seized by convulsions and she had three within the next two hours. The urine per catheter was loaded with albumin and casts. No attempt was made at nursing until marked improvement had been shown in the mother's condition, on the sixth day. In the meantime the breasts were kept pumped out and the child fed on modified milk. At the end of the week the child was put to the breast, as the mother's condition had been nearly normal. The child remained slightly below par and proved to be difficult to manage as to his ability to digest the mother's milk for about a month. From that time on he began to improve. No lesion of the kidneys was ever discovered and the urine appeared normal. These cases are reported not because of anything unusual, but with the hope that they may be of some use as evidence to corroborate the deductions drawn from the report of the cases of Dr. Goodall.

I cannot but feel that the milk of an eclamptic mother is toxic, even more than her blood, and that a seizure coming on, just prior to the secretion of milk, makes it doubly toxic as nature takes this mode of elimination and I shall continue to forbid a nephritic or eclamptic mother to nurse her newborn infant.

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DIFFICULT DETUBATION AFTER DIPHTHERIA. — Martens (*Deutsch. Med. Woch.*, August 31, 1911) has a series of 390 tracheotomies for croup with a mortality of 31.6 per cent. Of the 247 cases which recovered the tubes all came away save in two patients, who left the hospital before their regular discharge. Removal of the tubes in tracheotomia inferior must be promptly performed, but in tracheotomia superior the patient may go home with the tube *in situ*. The diphtheria service at the Bethany Hospital, Berlin, is enormous and it seems that primary intubation is never done there, although tubes are inserted to prevent secondary stenosis.—*Medical Record*.



## SOCIETY REPORTS.

### THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

*Stated Meeting, Held December 14, 1911.*

DR. WILLIAM SHANNON, CHAIRMAN.

#### A CASE OF CHONDRODYSTROPHY.

DR. GEORGE DOW SCOTT presented a female child about nineteen months old, whose family history showed no evidence of syphilis or alcoholism. The child was born normally without instruments. She showed the marked characteristics of the disease. There was the large head, the small tipped nose, the shortened long bones, the delayed dentition and the open fontanel. The child was rachitic; the skin of the legs cupped; the musculature feeble, as shown by the child's inability to stand. Marked kyphosis of the lower spine was present and an enlarged thymus. This case had been confounded with syphilitic rachitis, hydrocephalus and cretinism.

#### A CASE OF CHONDRODYSTROPHY.

DR. L. E. LAFÉTRA presented a baby four weeks old which had a marked degree of deformity and dystrophy. He also exhibited X-ray pictures showing the characteristic shortening of the arms and legs and a peculiar bending of the tibiæ, and he also presented, for purposes of contrast, pictures of a normal baby three weeks old. The difference in the length of the bones was very marked, the shortening being especially noticeable in the humerus, tibia and femur. In all the long bones the medullary cavity was seen to be wider than normal. A peculiar feature of this case was the marked exophthalmos present in both eyes.

DR. CHARLES HERRMAN said that these 2 cases together were very interesting and gave a complete picture of chondrodystrophy. The distinct exophthalmos present in Dr. LaFétra's case was a very rare complication of this condition. The radiograph of the lower extremities showed not only the curvature of the shaft and the enlargement of the epiphyses, but a distinct

change in the articulation at the knee. Dr. Scott's suggestion that the thymus was slightly enlarged in the case he had presented seemed peculiar in view of the fact that several authorities had advised the use of the thymus extract in the treatment of these cases. Two were under such treatment at present at the Vanderbilt Clinic. Some years ago he had tried the extract of the pituitary gland, but without marked effect; however, he thought that its use was less empirical than the use of thymus extract.

DR. WALTER LESTER CARR was of the opinion that these cases certainly were not normal, although they might be quick and alert they did not conform to the normal child. Some of them seemed elf-like and precocious, but their mental development was uneven and sexually they were overdeveloped.

DR. GEORGE DOW SCOTT asked if the minds of these children really were normal. He believed they were undeveloped mentally and cited the court jesters as persons who were funny because they were abnormal mentally.

DR. WARD B. HOAG said that regarding the differential diagnosis of cretinism from chondrodystrophy there were many physical points of resemblance in the two conditions. However, the marked difference in mentality should make the differential diagnosis fairly easy. In the positive cretin there was a practical absence of mentality, while in chondrodystrophy the mentality was not affected to any marked degree.

#### ABDOMINAL CYSTIC TUMOR IN A GIRL TEN YEARS OF AGE.

DR. SARA WELT-KAKELS reported the case of Rose K. Some eighteen months ago the child's abdomen was enlarged. She was frequently nauseated after eating but seldom vomited; she had obstinate constipation and frequent micturition, and occasionally complained of pain in the abdomen. She was fairly well nourished but pale, and weighed 68½ pounds. There were no Hutchinson's teeth, and the skin and visible mucosa were normal. The tonsils were hypertrophied and there was considerable enlargement of the abdomen, but no venous distention, and the umbilicus did not protrude. On palpation a large, smooth tumor was felt, which was cystic, rather tense, and pressed against the anterior abdominal wall, extending from above the symphysis to about one and one-half inches above the umbilicus.

Fluctuation could be readily obtained; there was little pain on pressure, percussion showed dullness all over the surface of the tumor. The tumor was but slightly movable and did not seem to be connected with any viscus. Evacuation of the bladder did not change the contour of the tumor and inflation of the colon showed it to be situated at one side of the tumor. The blood, urine and feces of the patient did not show anything abnormal; the von Pirquet test, however, was slightly positive.

They concluded that this was most likely an ovarian cyst. In making a differential diagnosis cystic tumors of the kidneys, liver, omentum and mesentery, as well as parasitic cysts, had to be considered, and also cysts having their origin in remnants of the ductus omphalomesentericus and such originating in the retroperitoneal space from remnants of Müller's and the Wolffian ducts.

#### HIRSCHSPRUNG'S DISEASE IN A BOY OF SEVEN YEARS.

DR. SARA WELT-KAKELS presented this boy, whose family history gave no evidence of syphilis or alcoholism. His mother had four children, the third dying when eight days old without, according to the mother, ever having had a movement of the bowels. The patient was born at full term and was breast-fed for fifteen months. He had been constipated from the time of his birth, the first movement occurring on the third day after birth, but only after glycerin enemata and laxatives had been administered. A few days after birth the abdomen appeared to be enlarged and distended. The bowels moved only once in two or three days and the movements were small. His condition grew worse during the second year, and on one occasion he remained constipated for thirteen days. The sphincter ani was stretched and a tube inserted through which large masses of fecal matter were evacuated. After this he was somewhat better for two months, when he again became worse. After an attack of diphtheria in his fourth year he was very weak, not walking much but preferring to lie down and sleep a great deal. At that time, June, 1907, he first came under Dr. Kakels' observation. His weight at this time was  $29\frac{1}{2}$  pounds; the circumference around the abdomen  $23\frac{1}{2}$  inches, and the distance from the xiphoid process to the umbilicus  $8\frac{1}{2}$  inches. Proctoscopic examination did not reveal anything very abnormal; the speculum could be introduced easily. In making a digital ex-



amination the finger fell into a large cavity above the ampulla. The urine showed a great deal of indican and skatol. Under strict diet, daily irrigations, and an occasional laxative the abdomen became smaller and his general condition improved. The patient remained under Dr. Kakels' care for about six months and then she did not see him again until November, 1911. In the interval the same treatment had been carried out and the boy's condition remained fairly satisfactory. During his sixth year he had had scarlatina and measles about a year later. Recently the abdomen had become enlarged and the constipation obstinate. Occasionally he had attacks of pain, which seemed to be relieved by the ventral position. The boy was emaciated, weighing  $44\frac{3}{4}$  pounds, and the superficial lymph nodes, both axillary and inguinal, were enlarged. The thorax was short and considerably broadened in its lower portion. The abdomen was enlarged especially between the ensiform process of the sternum and the umbilicus. The abdomen measured 27 inches in circumference, and the distance from the xiphoid process to the symphysis was  $5\frac{1}{2}$  inches. The umbilicus did not protrude, but the superficial veins were distended and movements of the intestines were visible through the abdominal walls. There was tympanites, but no tenderness and no resistance could be felt anywhere. The tonus of the sphincter ani was somewhat increased, but Foges' protoscope could be readily introduced, and it led into a large cavity at the upper end of which small, hard fecal masses could be seen. Tympanitic distension of the abdomen, visible peristalsis, obstinate constipation, occasional vomiting with abdominal pain and the fact that symptoms of the trouble had been present from birth assured the diagnosis.

The shadowgraph, taken in the prone position, showed an intestinal sac of enormous dimensions. Blood, feces and urine showed nothing abnormal.

The etiology of this rare disease was not quite clear. Danziger had collected 110 cases in 1907 from the literature, including his own son of three weeks. Hirschsprung assumed that there was a congenital dilatation and hypertrophy of the colon, a partial gigantism. Others, like Mya and Genersich, believed that there was only a congenital dilatation of the gut and that the hypertrophy was compensatory, due to stagnation of the contents of the gut; others, again, believed that there was only un-



due length with a multiplicity of flexures of the gut at birth, which led through stagnation of the contents of the gut to dilatation and hypertrophy. Marfan maintained that a functional stenosis might result from an anomalous position of the sigmoid flexure in its relation either to the colon descendens or to the rectum, which, again, might be responsible for the stagnation of the contents. In a smaller number of cases, volvulus of the sigmoid flexure, anomalous valves, etc., were found forming a mechanical impediment. The prognosis on the whole was not favorable, although patients might reach an advanced age. Death occurred more frequently from colitis, ulcerations and perforative peritonitis than from complete obstruction of the bowel. The most urgent indication was for the removal of the accumulated feces. Permanent drainage, massage, and electricity applied to the abdominal walls, together with proper dietetic measures were applicable in these cases.

The outlook for recovery was better when surgical treatment was resorted to. According to Denziger's statistics of 35 cases operated upon, 21, or 60 per cent., were cured, while of 59 cases not operated upon, 44, or 74.6 per cent., died.

#### ACUTE GLANDULAR FEVER IN CHILDREN.

DR. SIDNEY V. HAAS said that although the picture of this disease had been recognized by many observers and numerous papers had been written on the subject, there was still discussion as to whether such a condition existed *sui generis*, or whether it represented a state of glandular enlargement secondary to infection of the nasopharynx and mouth, or an atypical form of some disease having glandular swelling as an accompanying symptom. A review of the literature and the observation of an epidemic must convince one that the disease did exist as a clinical entity, even though its etiology was still obscure. The chief argument of those who held that the disease was not a clinical entity was that the glands that drained the nose, nasopharynx, pharynx and mouth, becoming infected furnished an avenue for the infection of more distant groups of glands, and hence the symptom-complex was only a manifestation of glandular enlargement due to a regional infection. There was as much reason for speaking of glandular fever as a separate disease as there was of speaking of scarlet fever, measles, *rötheln*, etc., as

such, for they were, after all, only the skin manifestations of mucous membrane infections and of the same area as that involved in glandular fever. The symptoms characteristic of glandular fever and those which refused to fit into the picture of any other disease were fever and malaise, acute swelling and tenderness of the glands of the neck, accompanied by a lesser involvement of the entire glandular system. There was a rapid recession of the symptoms, with sometimes repeated exacerbations of the fever and enlargement of the glands before complete recovery took place. While the disease occurred in both sporadic and epidemic forms, the latter form seemed to be the more common, possibly because single cases went unrecognized, or were classed as adenitis. An epidemic of 96 cases among 46 families had been reported by Park West. Many smaller epidemics had been reported. There was an extensive epidemic in New York City in the spring of 1911. Dr. Haas stated that in his practice 12 cases had occurred in 10 families from February 20th to June 2d. He had observed many other cases in the outpatient services of Vanderbilt Clinic and Lebanon Hospital.

In a study of the history of these cases the interesting fact had been brought to light that symptoms of the exudative diathesis existed in every instance and perhaps further study would prove this condition to be a predisposing factor in the production of glandular fever. The epidemics reported indicated that the disease was contagious. When it entered a household where there were other children, one or more usually became affected. The disease was essentially one of early childhood, the vast majority of cases occurring under the age of five years and comparatively few over the age of ten. Sex and social condition seemed to have no bearing on the incidence of the disease. Most of the cases occurred during the spring months.

The pathology of glandular fever was still obscure. While evidence pointed to the streptococci as the cause, it was not unlikely that more than one organism was responsible for the condition. As might have been expected, streptococci, staphylococci, pneumococci, and the influenza bacilli had been found in cultures taken from the throats of patients suffering with glandular fever. Several authorities had found streptococci in pure culture. Botchowsky and Korsakoff, in an autopsy on a case of glandular fever, found streptococci in pure culture in the glands of the

neck and axilla, in the liver, spleen, kidneys and medulla of the bones and the heart's blood. The glands showed acute parenchymatous hyperplasia with largely dilated blood vessels. In cases complicated by nephritis streptococci had been found in the urine. According to Park West, the incubation period of glandular fever was about seven days. The invasion of the disease was marked by a variable degree of prostration, pain in the limbs, headache, irritability, a moderately rapid pulse and occasionally vomiting. There was usually pain in the throat and there might be pain in the abdomen as well. Physical examination usually shows a child flushed, irritable, restless, with slight coryza, slightly congested pharynx and a temperature of from 102° to 105° F., and a pulse of from 100 to 140, with respirations in normal ratio to the pulse and temperature. At the angle of the jaw an enlarged and extremely tender gland would be found, which even in the early stage of the disease would cause the patient to hold the head in the position of torticollis. The chest and circulatory system were usually negative. The majority of cases complained of pain in the abdomen, which, according to Dr. Haas' experience, might be anywhere below the umbilicus. Within from twelve to forty-eight hours the gland at the angle of the neck was masked by a large, tender mass, just beneath and posterior to the upper end of the sternomastoid muscle and varying in size from a goose's egg to a pigeon's egg. The glands along the border of the sternomastoid muscle, the posterior cervical, the supraclavicular, the submental, submaxillary, and the parotids were enlarged, as well as the fine network of glands, 1 cm. in diameter that covered the entire lateral and posterior aspect of the neck. The axillary, epitrochlear, inguinal and mesenteric glands were frequently affected. There was scarcely any doubt but that the retroesophageal and bronchial glands were also often enlarged. The swelling was bilateral, but not always synchronous. In some cases the liver and spleen became palpable after a few days. The prostration and fever might disappear in from one to three days and the glands gradually diminish in size, or after a few days of fever and malaise there might be a sudden rise of temperature to 104° to 105° F., and the glands might assume the size of a goose's egg, or smaller; then the enlargement might slowly subside or there might be one or more exacerbations of temperature and swelling. The prognosis was good, although fatal cases had been reported, and



recovery was complete, though in some cases the glands might be slow in returning to their normal size. In typical cases the differential diagnosis was not difficult, but in those not so characteristic differential diagnosis had to be made from adenitis, having a distinct local process as its cause, from tuberculous and syphilitic adenitis, from Hodgkin's disease, from leukemia, from parotiditis, and from calculi in the salivary ducts. When the condition became intermittent or prolonged it had to be distinguished from pyelitis and malaria. If abdominal pain and tenderness were present to a marked degree it had to be differentiated from appendicitis and other intraabdominal disturbances. The complications noted were nephritis, which subsided after the disease had run its course or a systolic mitral murmur which appeared to be hemic in character and regularly disappeared after recovery. Suppuration had been reported, though it occurred but rarely. The failure to recognize the condition might lead to a false and grave prognosis, and hence the disease was entitled to a place in all text-books on pediatrics.

DR. CHARLES HERRMAN said that they had not as yet discovered the specific organism that caused acute glandular fever in children; most observers had found streptococci present, but they in all probability played a secondary rôle. With regard to the portal of entry one would naturally suppose it to be the nasopharynx; but because the glands in this neighborhood were infected it should not be said that the nasopharynx was of necessity the portal of entry. In cases of poliomyelitis, for instance, it was claimed that the microörganism entered through the nasopharynx; and the lesions produced were far from the nasopharynx. This held true in regard to lesions of the gastrointestinal tract. The character of the disease really pointed to its being a constitutional disease with the bacteria located in a special set of glands.

With regard to mumps and its differential diagnosis from acute glandular fever, the incubation period was fourteen to sixteen days in the former and much less in the latter. Again there was a marked difference as regarded the age of the patients. Mumps was practically unknown under the age of one year; it usually appeared between the ages of five and ten.

It was interesting to note the close relationship between the exudative and the lymphatic diatheses in these cases.



THE DIAGNOSIS AND TREATMENT OF VOMITING IN INFANTS BY  
MEANS OF THE DUODENAL CATHETER.

DR. ALFRED FABIAN HESS, in summarizing his paper, said that it was not difficult to insert a soft rubber catheter (Nelaton No. 15 F.) past the pyloric sphincter and into the duodenum. The catheter was introduced in the same way as an ordinary stomach tube. After some experience the technique became very simple. The catheter differed from the duodenal tube previously described by Dr. Hess in that it did not depend upon gravity or peristalsis to direct it to the pylorus; the mere force of inserting it propelled it along the natural path of the food to the pyloric opening. This fact enables it to be introduced readily and surely and gave it the additional advantage of a probe with which they might test the tonicity and irritability of the pyloric sphincter. Radiographs showed that upon entering the stomach the catheter invariably bent sharply to the left to reach the fundus, and that, therefore, the mere vertical position of the infant's stomach did not account for the ease with which the duodenum was entered. It was probable that unknowingly others had entered the duodenum in this manner and possibly in many instances reports as to the capacity and contents of the infant's stomach had been subjected to this error. Pylorospasm could be readily diagnosed by means of the catheter, and it could be differentiated from vomiting from other sources. In the case of spasm they met with persistent resistance at the same point every time an attempt was made to pass the catheter; this was accompanied by sensitiveness of the pylorus. The spasm might be felt to relax suddenly, thus permitting entrance to the intestine. Marked pyloric stenosis could be diagnosed by the failure of the catheter to transgress the pylorus after repeated attempts. A mild degree of stenosis could not be differentiated from simple spasm. Cardiospasm frequently accompanied pylorospasm. This sign had been frequently overlooked because of too forcible insertion of the stomach tube. As a result of cardiospasm the soft rubber tube as originally used might fail to enter the stomach. Just as marked gastric secretion accompanied pylorospasm so did an increased duodenal secretion. This secretion contained protease, lipase and amylase to a marked degree so that in this connection they might speak of a pancreatic hypersecretion of suc-corrhea. There were cases of cardiospasm and pylorospasm un-

accompanied by increased gastric secretion, and likewise there was no pancreatic hypersecretion. The catheter was valuable in the therapy of pylorospasm; its passage seemed to relax the pyloric ring and thus to diminish vomiting. It would seem an advantage to pass the catheter frequently in such cases. Another form of therapy consisted of duodenal feeding, which radiographs showed was feasible. It should be reserved, however, for such cases as did not retain food given by gavage. The food should be given slowly and in not too large quantities.

WHY OUR OBSTETRICIANS SHOULD EITHER EXTEND THEIR LINE OF ENDEAVORS OR CONFER EARLIER WITH THE "PEDOTROPHISTS."

DR. WARD BRYANT HOAG spoke of the general awakening to the need of combatting the high infant mortality. The fact that 20 per cent. of all babies born died before they reached the age of one year showed how necessary this work was. While the majority of deaths occurred among the poor, still the infant mortality in all classes was too high. Discreet advice for the baby at the time of birth and a little "follow up" work afterward was better than a great deal of endeavor after nutritional disturbances had been allowed to develop. They had no specialty which applied to prophylactic work or simply "care of children," and this might account for the neglect to give the baby a proper start. In their work with children the greatest possibilities lay along the lines of protective and preventive efforts. This was a broad and comprehensive specialty, and the time was ripe for the schools and specialists to extend their usefulness to the prophylactic specialty of childhood work. Midwives attended 43 per cent. of the births in New York, and while there were no statistics the death rate among these infants was very high. Gastrointestinal diseases killed from 60 to 75 per cent. of the infants that died during hot weather, and from one-third to one-half of each year's victims died before reaching the age of three months. The indisputable inference from figures and facts would seem to the author to indicate that there was some radical defect or neglect on the part of those who should early advise for the infant's nutrition and care.

The best obstetricians in the city acknowledged that they took little or no thought regarding the many details influencing the infant's nutrition and care. This advice was largely left to the

nurse, and too frequently she failed to start the baby in the right way. This failure to consider the baby was noticeable by the fact that in most of the large institutions no part of the regular attending staff was made up of practitioners who gave special thought to infant feeding or questions pertaining to infants in general. Dr. Hoag said that 75 per cent. of the needless mortality could be ascribed to the law that made it possible for more or less ignorant women to care for women and their infants at the most crucial period of the life of either. What he said regarding the attitude of the specialist toward the baby applied equally to the general practitioner; he thought too little about conserving the infant, and began his endeavor only after more or less harm had been done.

As a remedy for this condition the work of Dr. Hill and Dr. Herman Schwarz might well be considered a model. They instructed the mothers before they left the institution and followed them up afterward. Of 774 children born under their charge from November, 1908, to November, 1909, 38 died. There were 105 born under their care that passed from their attention before the expiration of the year. This brought their mortality well under 6 per cent., a very marked contrast to the general mortality throughout the city. This work was among the very poor. In private work the writer was conversant with a record of 117 infants born between 1905 and 1909, where but 2 failed to live, a mortality of less than 2 per cent. There should be attending pedotrophists in all lying-in institutions who should assume to advise from birth on all questions concerning the baby. When the condition of the mother was favorable she should be taught all the fundamentals of the care of her baby. Then when the mother left the institution she would have some idea of her responsibilities; she would know what she was expected to do and how she should do it. Again, a mother who had been taken into the confidence of the physician would have respect only for advice that came from a physician and would not accept that of some old woman. Among the very poor the follow-up work of the visiting nurse could be made invaluable not only to the baby, but to the entire household. In private practice certainly no less advice should be given the mothers than was given to those cared for in institutions. If the surgeon did not wish to properly instruct the mother he should have an associate who would do this work.



DR. GEORGE L. BRODHEAD said that the paper was a very valuable one which demanded much attention and consideration, but he thought that Dr. Hoag was inclined to be rather severe in his arraignment of the obstetrician and the general practitioner. Dr. Brodhead did not think that they as a class paid so little attention to the details which concerned the nutrition and the development of the children under their care. Many years ago the duty of the obstetrician toward the child was supposed to cease when he had tied the umbilical cord and handed the baby over to the monthly nurse. That day had long since passed. The baby should by all means be given due consideration. Personally, he felt that a mother who had gone through a nine months' stormy pregnancy did so because she was desirous of having a healthy child. It seemed to him that the child was deserving fully as much attention and consideration as the mother.

DR. FLOYD M. CRANDALL said that the paper read was of great interest to him, because it was in the line of preventive medicine. Certainly advances had been made in this direction. He compared the teachings of years ago with the teachings of today. "Start the baby right." It seemed to him that there were three classes of people who had charge of our babies from the first day of life. The first was the obstetric specialist; in this class there had been a great improvement during the last twenty years. They certainly used to pay but very little attention to the babies. The second class might improve very much; this class embraced the general practitioner who did much obstetric work and who paid but little attention to pediatrics or to the baby, and it was a hard proposition to know just how to deal with them. They were the worst kind of baby-weaners and usually told the mothers to buy a certain baby food and to use it according to directions. The third was the midwives. Much could be accomplished by following up the babies when the birth report went in, such as was being done now, but the birth return often did not go in until one week or more after the birth of the child and by that time the damage was done. Much of the damage was done during the first week, and this week was one of greatest importance to the baby's welfare.

DR. GEORGE DOW SCOTT said that in this line of work, both in this city and in Boston, he had been impressed with the fact that the mother's breasts were often neglected. More attention



should be given to the breasts of the mother as well as to her diet.

DR. WILLIAM SHANNON agreed with Dr. Brodhead in regard to the advance that obstetrics had made, and also with what Dr. Scott had said in regard to the care of the mother's breasts before the birth of her baby. Many institutions were very negligent so far as the care of the baby was concerned, and he believed that in many instances the obstetrician was at fault. The nurses, as a rule, directed the feeding under the guidance of a text-book written by a good man but often misleading the nurse and the mother. He thought these books did much harm, especially in cases of difficult feeding.

DR. WARD B. HOAG, in closing the discussion, said that he did not wish to be considered as criticizing any class of men; that his remarks were to be considered as one more effort to be added to the many already devised to lower early infant mortality. The very large mortality during the third week of life was evidence of some radical defect in the advice given regarding the care of the baby during the first week. Too many breast-fed babies came from lying-in institutions, and only too frequently the instructions given concerning the contents of the bottle were such that it was very evident that proper consideration had not been given the subject. Dr. Hoag said that he thought that if his suggestions could be made practicable the results both in institutional work and in private practice would be satisfactory to all concerned.

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NEW METHODS OF TREATING EPILEPSY. — Fackenheim (*Münch. Med. Woch.*, August 31, 1911) calls attention to a new resource introduced of late years in the treatment of epilepsy. In 1908 Dr. Self of Texas claimed to have seen cured permanently a chronic epileptic following a rattlesnake bite. The snake venom or crotalin had already been used for this purpose, and Spangler reported some results very recently. The present author obtained some of the venom for testing and found it to exert a specific or quasi specific action on the disease of the greatest promise. It is, of course, true that the number of years which have elapsed since the treatment was first used is far too short to be conclusive.—*Medical Record*.

## THE PHILADELPHIA PEDIATRIC SOCIETY.

*Joint Meeting with the Clinical Congress of Surgeons of North America, November 14, 1911.*

J. TORRANCE RUGH, M.D., PRESIDENT.

## PYLORIC STENOSIS IN INFANCY.

DR. CHARLES L. SCUDDER, of Boston, by invitation, read a paper on the surgical treatment of pyloric stenosis in infancy. He presented the facts about stenosis of the pylorus in infancy, the reasons why surgery offers the best treatment and showed lantern slides demonstrating certain facts concerning this most important condition. He described the pathology. The prognosis is fatal without treatment. The diagnosis is sometimes difficult because of mistaking pure spasm of the pylorus for a common tumor case. The treatment of the pyloric spasm alone is medical. The treatment of a pyloric tumor alone is, in infancy, by operation. Posterior gastroenterostomy is the chosen operation, as it does not interfere with metabolism. There is evidence that a pyloric tumor persists. If this be true, the basis of the operative treatment has a good foundation. Operation should be done as soon as the diagnosis of a tumor obstruction is made.

DR. JOHN B. DEEVER spoke in strong terms of the necessity for operation in the treatment of pyloric stenosis in infancy. He said that great numbers of these infants die on medical treatment, since the correct diagnosis is not made, the children being treated as cases of "marasmus."

DR. EDWARD B. HODGE said that Dr. Scudder's previous paper (in *Surgery, Gynecology and Obstetrics* for September, 1910) and this address both showed clearly the truth of two points; that this condition can be successfully treated surgically and that these patients grow up into healthy children. But these cases all have organic tumor. Dr. Hodge thinks there is danger of operating upon patients who have no tumor, cases which can be treated successfully medically. The surgeon should be called in early, that both physician and surgeon may study the case to-

gether. The operation is relatively safe, the mortality now being under 10 per cent.

DR. HARRY LOWENBURG referred to a patient of his, reported recently, upon whom operation had been successful at the age of six weeks. He has observed 5 cases of pyloric stenosis. He considers absolute constipation the most important indication for operation, more important than palpable tumor or peristaltic waves. Bowel movements in cases which require operation consist of bile-stained mucus only.

DR. ROLAND HILL, of St. Louis, has seen many such cases treated medically; but recently he had a baby of five weeks operated upon successfully.

DR. SCUDDER, in closing, described his technique. Infants must be kept thoroughly warm during operation. A skilled anesthetist is necessary. If the baby should get blue, a little oxygen will overcome the difficulty. The only disinfection used is 70 per cent. alcohol for bathing the abdomen before operation. The incision, which should be low and to the left of the umbilicus, must be long. He only takes out of the abdomen the part to be operated on. Select the jejunum, close to the ligament of Treitz, for the anastomosis. The incision in the stomach and intestines are about an inch long. He uses linen and zero chromic gut for sutures. The abdominal wound is closed with interrupted sutures, layer by layer. After operation whey is given first, two drams every hour, by medicine dropper; increased gradually if there is no vomiting. It seems unfair to the surgeon for the physician to have starved the infant before handing it over to the surgeon for operation.

#### SOME DIFFERENCES BETWEEN THE SURGERY OF CHILDREN AND ADULTS.

DR. CHARLES N. DOWD, of New York, by invitation, read this paper. Dr. Dowd spoke of three topics in which the surgery of children differed from that of adults, one in the neck, "inflammation of tuberculous lymph nodes"; one in the chest, "suppurative pleurisy or empyema," and one in the abdomen, "tuberculous peritonitis." He spoke of 465 operated neck cases. Fifteen were in young children who showed more tuberculosis in other parts of the body than the older children; eradication of the disease was more difficult. None died after operation, but

two died later, one of general tuberculosis, the other of tubercular meningitis. Twelve have been traced and are still in good condition. Between the ages of two and seventeen years the clinical picture is fairly definite. Lymph nodes in the upper part of the neck break down before the lower ones are involved. In this group were 374 patients. The nodes were thoroughly removed, with an operative mortality of  $\frac{1}{4}$  per cent. Patients are usually out of bed in three days and out of the hospital within ten days. About 75 per cent. are free from recurrences and about 90 per cent. ultimately cured. The scar resulting is insignificant. In adults the inflammation is apt to extend to the lower lymph nodes of the neck before a cold abscess is formed above. The tuberculous inflammation is more extensive and the operation more difficult, but still gives excellent results.

Dr. Dowd observed 204 cases of empyema in children to 40 cases in adults. In children the empyema is usually but a part of a general pneumococcic infection; 51 per cent. healed promptly after opening the chest and resecting a small piece of rib; 19 per cent. healed more slowly; while 30 per cent. died with evidences of pneumonia, peritonitis, pericarditis or other general infection; 79 per cent. of the bacteriological examinations indicated pneumococci as the infecting agent. The patients in whom lung contraction persisted usually did well with thoracoplasty and decortication. In adults only 32 per cent. showed pneumococcic infection. Here the results of thoracoplasty and decortication were less favorable.

Dr. Dowd observed 46 children and 30 adults with tuberculous peritonitis. Fluid was present in the children in marked degree only seven times, and in only four instances could the appendix be removed. Several of these patients showed marked improvement after the operation. Of the adults 40 per cent. had excessive amounts of fluid; 50 per cent. had the lesion so localized that either a portion of the intestine or the uterine appendages were removed.

DR. HENRY R. WHARTON was surprised that Dr. Dowd had not seen more cases of tuberculous lymph nodes in the neck of children under one year of age. He agreed with Dr. Dowd that their occurrence was more frequent after that age. Dr. Wharton believes that if operation for empyema is done early, recovery results. In infants he usually employs intercostal drainage;



in children he removes a portion of a rib. In tuberculous peritonitis he operated when abdominal effusion is present, without breaking adhesions, since free manipulation is apt to be followed by the development of fecal fistula.

DR. JOHN H. JOPSON advised calling all cases of cervical adenitis tuberculous, since that statement decided parents to permit operation, which nowadays consists of total extirpation of the glands. If the disease is eradicated a permanent cure is reasonably sure. He could not recall a case of empyema in a child which did not follow pneumonia. Dr. Jopson referred to a child now under his care with tuberculous peritonitis, complicated by hepatic cirrhosis, who has done well since the operation.

DR. DOWD, in closing, spoke of the after-treatment of these cases. The empyema patients were not benefited by any suction apparatus more than when simple drainage into the dressing was secured. In the neck cases drainage is also important. Good hygienic surroundings are of value for all of these patients. The good results in the neck cases lead one to believe that the inflammation must have been localized to a comparatively small area of the neck.

#### STEREOARTHROLYSIS.

DR. R. TUNSTALL TAYLOR, of Baltimore, by invitation, read a preliminary report and experimental study in arthroplasty. After reviewing the literature upon the treatment of ankylosis, he discussed the embryology of the articulations and the effect of muscular activity upon joints. He then enumerated the essentials in forming a new joint and described the various waxes, mixtures of which he used in his experiments. After describing investigations in the formation of new joints in ten rabbits, Dr. Taylor gave in detail the histories of four patients for whom he made new joints with mobility, in place of ankylosed joints. This work was done in the past six months, in the James Lawrence Kernan Hospital for Crippled Children in Baltimore.

DR. H. A. WILSON commented upon the fact that the muscular atrophy from disuse in longstanding cases of ankylosis is the most serious factor. So far Dr. Wilson has used chromicised pig's bladder, as recommended by W. S. Baer, but will now try wax. Permanent success depends on the selection of patients with fibrous ankylosis; the avoidance of operation in joints that

are seriously deformed or of long standing; the removal of enough joint to secure great freedom of motion; early institution of passive motion; early establishment of voluntary muscular control; the avoidance of fixation appliances that interfere with normal function.

DR. G. G. DAVIS said that this subject is as interesting to the orthopedic surgeon as cancer is to the general surgeon. Attempts to produce movable joints by introducing foreign bodies have been failures, as has the removal of a large amount of tissue from the joint. Yet ankylosis of the elbow treated by resection has given some pretty good joints after all. In the knee, of all ankylosed joints, it is most difficult to get a good result. If the wax does not irritate the problem is almost solved.

DR. RUGH congratulated Dr. Taylor upon his method of treatment. Anyone doing work of this kind will realize the importance of this communication to the surgical world.

DR. TAYLOR, in closing, said that this method seemed more helpful in cases of osseous ankylosis than in the fibrous types of rheumatoid and gonorrheal origin. It is best not to move the joints for three weeks after operation, although traction should be used by the end of the first week. The silver skin suture should be left in three or four weeks, as the capsule has been desected away.

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PSEUDOFEVER IN CHILDREN.—Avellis (*Münch. Med. Woch.*, August 31, 1911) has often noted in children up to eight years of age a temperature rise of over 1°C. in which the patients were subjectively normal, ate well, and showed no trace of emaciation after prolonged intervals. Such children go from one practitioner to another and get no relief. They are kept in bed, and while no real diagnosis is made a slight tonsillar infection or some other local ailment is assumed to exist. Thermometry simultaneously in several localities in the body shows such discrepancies that a general febrile reaction seems absent. If subjectively and otherwise well the child should not be kept in bed. The real causes of the slight, perhaps local, temperature rises must be varied. The "fever" often yields to the use of artificial sour milk, which seems to connect these particular cases with intestinal fermentation.—*Medical Record*.

## CURRENT LITERATURE.

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### ABSTRACTS IN THIS NUMBER BY

DR. C. D. MARTINETTI.  
DR. RICHARD M. SMITH.

DR. FRITZ B. TALBOT.  
DR. J. HERBERT YOUNG.

### PATHOLOGY.

LÉVY-VALENSI, M. J.: VISCOSITY OF THE CEREBROSPINAL FLUID, NORMAL AND PATHOLOGIC (VISCOSITÉ DU LIQUIDE CÉPHALO-RACHIDIEN, NORMAL ET PATHOLOGIQUE). (*Gas. des Hôp.*, April 6, 1911, Vol. LXXXIV., No. 40, p. 603.)

Lévy-Valensi determined the viscosity of the cerebrospinal fluid in 32 cases, including epilepsy, tabes, hemiplegia and various forms of meningitis. In all the cases the viscosity was very near that of distilled water. The slight variations found he considers of no diagnostic importance. These variations had no relation to the absence, presence or number of lymphocytes, nor to the presence or absence of globulin. J. HERBERT YOUNG.

KOLMER, JOHN A.: A NOTE ON THE BACTERIOLOGIC EXAMINATION OF LYMPHATIC GLANDS IN SCARLET FEVER. (*American Journal of Diseases of Children*, 1911, Vol. II., p. 327.)

Kolmer describes the findings in 11 cases of scarlet fever in which he made cultures from the glands. In 27 per cent. streptococci were secured. In the others staphylococci and other organisms. No organisms resembling those described by Vipond were found. RICHARD M. SMITH.

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### SURGERY.

MURPHY, FRED T., AND VINCENT BETH.: AN EXPERIMENTAL STUDY OF THE CAUSE OF DEATH IN ACUTE INTESTINAL OBSTRUCTION. (*Boston Medical and Surgical Journal*, November 2, 1911, p. 684.)

The writers conclude that interference with circulation of obstructed intestine is the vital factor in the production of the typical symptoms of acute ileus. The obstruction of the venous return is the most important element in this circulatory disturbance. The acute symptoms are caused by the absorption of

a toxic substance which is found in the obstructed intestine. This toxic substance is destroyed by boiling. It is not soluble in water and will not pass through the Berkefeld filter. The formation of this substance probably is not dependent on any vital secretion of the mucous membrane of the intestine. The rapidity of absorption varies, dependent on the patency of the lymphatic channels in the mesentery and the permeability of the intestinal wall. They conclude, therefore, that this toxic substance is purely bacterial in origin and that the living bacteria with their end toxins not the putrefactive products nor the chemical poisons are directly responsible for the profound symptoms and death in acute intestinal obstruction.

FRITZ B. TALBOT.

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### MEDICINE.

TOVANE, ANTONIO: PARATHYROID HEMORRHAGE AND INFANTILE TETANUS. (*La Ped.*, August, 1911.)

With a view to casting light on the contradictory statements made in the literature on parathyroid hemorrhage in its connection with infantile tetanus the author gives the results of extensive researches just completed. While there is undoubtedly some connection between the two conditions this is by no means constant. Often the parathyroids in children affected with tetanus have been found normal. Parathyroid hemorrhage would only appear to aggravate any alteration in the glandular function.

C. D. MARTINETTI.

WOOD, B. E.: PROGNOSIS IN INFANTILE PARALYSIS. (*Boston Medical and Surgical Journal*, October 5, 1911, p. 528.)

The writer undertook the investigation as to the present condition of those cases of infantile paralysis which were reported to the Board of Health in the year 1907 in order to ascertain the number of recoveries occurring in the four years and thereby to increase our knowledge concerning the prognosis in this disease. In anterior poliomyelitis complete recovery or functional recovery occurs in something over 25 per cent. of cases examined at the end of four years. Atrophy may exist without impairment of function. In about half of the recovered cases the onset was mild. The distribution of the paralysis in such



recovered cases was not essentially different from that in cases which do not recover. Recovery in many instances required months, and in several cases from one to three years.

F. B. TALBOT.

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### HYGIENE.

BADGER, GEORGE S. C.: OPEN-AIR ROOMS AND HOSPITAL SCHOOLS. (*Boston Medical and Surgical Journal*, November 23, 1911, p. 791.)

The authors conclude that children must be taught the principles of hygiene and right living; fresh air must be provided for all school children; trained school physicians must be properly paid for the work they do; school nurses must everywhere be made a part of the system as the most important means of making the school physician's work effective; there must be fresh-air rooms for ailing children; proper hospital facilities for acutely sick children and tuberculosis camps or wards for consumptive children. Above all, the public must be educated to see the reason for all this, and to insist upon it.

FRITZ B. TALBOT.

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### THERAPEUTICS.

OTT AND SCOTT: THE ACTION OF ANIMAL EXTRACTS UPON THE SECRETION OF THE MAMMARY GLANDS. (*Therapeutic Gazette*, 1911, Vol. XXXV., p. 689.)

After reviewing very thoroughly the literature on the subject the authors report experiments in which they tried to stimulate the production of milk in the goat. Animal extracts were rubbed up in a mortar with distilled water, filtered through cotton and injected into a vein in the ear or leg. The amount of milk excreted was noted for three five-minute periods. Infundibulin starts the flow in about one minute from the beginning of the injection and it reaches its height in four minutes, after which it rapidly falls to normal. They also found that corpus luteum, pineal body and thymus increased the equality of milk fourfold in five minutes. The amount of butter fat is about the same in the augmented secretion. Boiled thymus had no effect.

RICHARD M. SMITH.

## BOOK REVIEWS.

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REPORT OF THE PHILADELPHIA MILK SHOW: ITS ORGANIZATION AND MANAGEMENT AND A DESCRIPTION OF THE EXHIBITS. Edited by ARTHUR EDWIN POST, Bureau of Municipal Research, Executive Secretary, Philadelphia Milk Show. Illustrated. Pp. 123, with many inserts. Published by the Executive Committee, 1911.

No city now need hesitate to have a milk show on the score of not being able to find out how to do it. There may be other difficulties in the way, lack of funds or the lack of workers as enthusiastic and self-sacrificing as those who planned the show in Philadelphia and who carried it out with such remarkable thoroughness and success; but this report shows what to do and how to do it beyond the peradventure of a doubt. It is a remarkable compilation, reflecting much credit upon the editor, who also had much to do with the show itself, and upon all who helped in one way or another. Tables, reproductions of stationery, leaflets and placards, illustrations of exhibits, etc., are so abundant and instructive that we can but mention them here. Written with the announced purpose of putting the procedure of such a show into a transmissible form, the report has fulfilled its purpose and blazed the way for future effort.

CURRENTS OF HIGH POTENTIAL, OF HIGH AND OTHER FREQUENCIES. By WILLIAM BENHAM SNOW, M.D., late Instructor in Electro-Therapeutics in the New York Post-Graduate School and Hospital, etc. Second Edition. Pp. 275. New York: Scientific Authors' Publishing Co., 1911.

This work has been entirely revised and rewritten and enlarged and forty cuts have been added. The work contains the results of the author's personal researches and investigations, and includes most that is valuable on the subject of High Potential Currents. The developments in the subject of Hypertension and its treatment by the d'Arsonval current has been thoroughly considered in this edition.

PRÉCIS DE MÉDECINE INFANTILE. Par le DR. P. NOBECOURT, Professeur agrégé à la Faculté de Médecine de Paris, médecin des Hôpitaux de Paris. Second edition revised. Pp. xiv, 932. Paris: Masson et Cie, 1911.

This is a rather complete treatise on the diseases of children, although it is called an abstract. The author has attempted, however, to keep the size of the book down and maintain its practical character, avoiding much which has not been proven of value to the practitioner, but yet keeping the book up to date. It presents the French point of view in an admirably direct and compact form.

LA SCARLATINE. Par le DR. A. LESAGE, Médecin des Hôpitaux de Paris. Pp. 158. Paris: Masson et Cie, Gauthier Villars, 1911.

This is a very convenient and interesting little book as well as a most instructive one. The author, who has written a large textbook on the diseases of children, has wide experience in the management of scarlet fever and writes with authority. We recommend this little manual heartily.

DENTAL DISEASE IN ITS RELATION TO GENERAL MEDICINE. By J. F. COLYER, L.R.C.P., M.R.C.S., L.D.S., Dental Surgeon to Charing Cross Hospital and the Royal Dental Hospital; Member of the Board of Examiners in Dental Surgery of the Royal College of Surgeons, England. With the assistance of STANLEY COLYER, M.D., London, M.R.C.P., D.P.H. With illustrations. Pp. 189. London: Longmans, Green & Co., 1911.

This is an excellent book, full of very good and instructive illustrations. It opens to the view of the practitioner a field which he is too much inclined to leave alone. We all need to be made aware of the effects of maldevelopment of the jaws and teeth, of mal occlusion and dental caries on the general health of the individual, and we very seldom are aware of them. Drs. Colyer have done a great service by calling attention to this relationship. Pediatricists will find of especial interest the chapters on Normal and Pathological Dentition, Conditions which Influence the Growth of the Jaws and Teeth, Caries, Oral Sepsis, Diseases from Reflex Irritation and Dental Diseases in Children. As a supplement to the advice given in the editorial of this number of the ARCHIVES this book will prove a profitable investment.

# ARCHIVES OF PEDIATRICS

FEBRUARY, 1912.

ROYAL STORRS HAYNES, PH.B., M.D.,

EDITOR.

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## EDITORIAL.

### ONCE AGAIN THE MILK PROBLEM.

The Fifth Annual Report of the New York Milk Committee should be in the hands of every reader of the ARCHIVES OF PEDIATRICS, for the problem with which the Committee has to deal and has been dealing so thoroughly and effectively is one which should be understood by every physician into whose care children come. No matter what the interest with which the internist, the surgeon, the sanitarian may view the attempt to find out how to obtain pure milk or to prevent the contamination of the milk supply, his interest cannot be so direct as that of the



pediatrist, for the latter's patients, the children, are at once the greatest consumers of milk, and the most susceptible to its deleterious influences when it is impure.

We have commented upon the result of last summer's campaign of the committee for the reduction of infantile mortality of the Milk Committee and may have occasion again to call the attention of our readers to it when its individual report is issued. Here let us merely recall that the death rate in the districts where the milk stations were in operation was much lower than that in the rest of the city, and it was computed that "if the death rate among milk stations babies had prevailed throughout the city there would have been only 3,668 baby funerals instead of the 5,567 that actually took place in the months of July, August and September.

As an example of what can be accomplished by organized education of mothers, the work was most instructive. The facts obtained in the campaign were given publicity at state fairs and pure food shows, as well as by many newspaper and magazine articles and by the distribution of over 200,000 pieces of printed matter. One result of the campaign has been an increase in the number of public milk stations in New York from fifteen to fifty-five, in itself a remarkable bit of work.

The Milk Committee also conducted an investigation during the year into the condition of the loose milk which enters New York City, tracing the supply from farm to consumer, and gathering much interesting information as to cleanliness, methods of handling, temperature of milk, rapidity of transportation and bacterial content at all stages. This makes an important part of the year's report and should command sincere attention.

The successful completion of the experiment in trying to produce a milk of the grade of certified milk at the cost of ordinary milk, detailed in the report, should point the way for other experiments and other companies. Following the methods laid down by Dr. Charles E. North, the Dairy Demonstration Company, entered the producing field, and by the simple methods of

sterilizing utensils and cooling the milk immediately, combined with premiums for excellence to stimulate the farmer's coöperation, has produced regularly milk running under 22,000 bacteria at the milk stations and under 7,000 in the country, going as low as 2,000 at the stations at times, and 1,400 in the country for monthly averages. This was the milk supplied to the stations and used there with such great success.

The National Commission of Milk Standard, initiated under the auspices of the milk Committee, has met and started work upon a set of standards for milk production which may be enforced throughout the United States.

Encouraged as they well may be by the results of the year's campaign, the Committee proposes to go farther in 1912 and have laid out for themselves plans which indicate high hope of greater achievement for this year.\*

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## SEX EDUCATION.

Did space permit, and had Dr. Wile's article not been so comprehensive, we might have been tempted to discuss that most important branch of sociologic work, sex education. We believe most heartily with Dr. Wile in his principles and feel sure that his methods must produce adequate results. The time must come when the wonderful phenomena of sex and reproduction shall have their due reverence in the minds of men. And the first requisite for a parent to have who hopes to teach his or her child properly about these subjects must be a purity in his conception of sexual relations, both in general and as applied to his or her own life. No one can transmit to a child's innocent mind an innocent idea of the basis of life unless he or she has ceased to become ashamed and has indeed become proud of everything which contributes to the continuance of the race.

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\* The address of the New York Milk Committee is 105 East Twenty-second Street, New York City.

## ORIGINAL COMMUNICATIONS.

### THE USE OF INTESTINAL ANTISEPTICS IN CHILDHOOD.\*

BY ALFRED HAND, JR., M.D.,  
Philadelphia, Pa.

The invitation to say a few words to-night came to me in a very suggestive way, more so than the Chairman of the Programme Committee probably realized. His words were, "Will you take the part of children in a discussion on the use of intestinal antiseptics?" And I am very glad to do so, because sometimes, I cannot say how often, we are apt to make more effort to cure the disease than to cure the patient. So that our first thought, especially in handling the quickly responsive organism of the child, should be, "What effect will this treatment have on the patient?" and, secondly, "What effect will it have on the disease or its germs?"

It is always well to consider the meaning of any subject under discussion in order that we all may talk about the same thing, and so we may ask, "What is an antiseptic and how does it differ from a disinfectant?" The generally accepted meaning of an antiseptic is that it is a substance which retards the growth of microorganisms of all kinds, pathogenic or non-pathogenic, while a disinfectant is a substance that kills the germs of disease. Strictly speaking, therefore, our aim should be not to retard the growth of microorganisms in the intestinal tract (for germs are needed there for the proper development of the host), but to kill those germs that are causing trouble; in other words, to disinfect, and it is pertinent to inquire what germs we are expected to destroy. Leaving out of discussion the animal parasites such as the ascaris, the oxyuris and the tenias, with their specific disinfectants, santonin, quassia and male fern, we find ourselves at once in the broad field of study of the intestinal flora, which, simpler as it is in childhood than in adults, is comparatively little explored, although a great amount of work has been done with some very definite results. To treat this subject fully would take us too far from the topic under discussion, but

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\* Read in a Symposium before the Philadelphia County Medical Society, November 9, 1910.

it would be well to note the captions given by Moro, that in health the intestinal flora depend upon the kind of food taken by the infant, a diet rich in starch favoring the development of the fermenting saccharolytes, while food rich in albumin favors the growth of the putrefying proteolytes, and, as Escherich pointed out, the possibility therefore exists of restraining intestinal putrefaction by giving starch plentifully; for fermentation and putrefaction cannot go on in the same medium.

It is still a debatable question whether bacteria normally present in the intestinal tract can, under certain conditions, give rise to inflammation, or whether all cases of enteritis do not belong to the ectogenous group of Escherich, the germs being introduced from without. Three main groups of pathogenic germs have been described in the great disorder of infancy and early childhood, ileocolitis, the streptococcus of Escherich, the colon bacillus and the dysentery bacillus of Shiga-Kruse and Flexner. The colon bacillus is, of course, a normal inhabitant of the intestinal tract, but bacteriologists claim that the one normally present in any given case is of a different strain from the one causing trouble, the latter probably having been introduced from without, so that as the pathogenic one is overcome the normal one returns. The separation of these cases of ileocolitis bacteriologically is only possible through the services of a skilled bacteriologist and a well-equipped laboratory. Clinically, such distinction cannot be made and for purposes of treatment such distinction is not necessary, as the same fundamental principles underlie all the groups.

As was said above, we must consider the patient first of all and do him no harm, while we have the absolutely necessary aim of ridding the intestine of the invading, hostile germs. It is always better to keep the peace than to fight for it, so I cannot resist digressing for a moment to speak of the prevention of enteritis by avoiding the introduction of these disease germs. And as most of them gain entrance in the company of milk, clean milk is a necessity. But as we cannot tell when human fallibility will break into the most carefully guarded plan of milk production, distribution and consumption, it is always safer, for at least nine months of the year in this climate, to pasteurize the milk taken by infants and children. When, in spite of the best of care, the intestinal tract is invaded by disease-producing germs, the first symptom of any trouble is an indica-



tion to sweep the invading army out at once before it can effect a foothold; and the initial dose of castor oil, salts or calomel acts mainly as a dislodger rather than a disinfectant. Unfortunately, the few golden moments when this is possible too often slip by with nothing done, and the germs become securely entrenched in the intestinal mucosa. It has been established by clinical observation that putrefaction favors the action of these germs, and we therefore have a fundamental principle of treatment in the withdrawal of milk and all foods which must be ultimately broken down by putrefaction. Milk and all milk foods, such as condensed milk, whey or any of the dried malted milks must be absolutely forbidden until the discharges have lost all evidences of acute inflammatory processes, in the disappearance of blood and greenish mucus. All remains of milk in the alimentary tract must also be removed by purgation, as mentioned above, colonic irrigation being also valuable. Just as in human warfare, hunger is a potent ally in reducing to submission a beleaguered city, so in ileocolitis the battle is half won if we prevent the disease germs from receiving means for their sustenance; for if milk is withheld for twenty-four hours or longer if necessary (and it usually is) most of the germs will probably die, this being a disinfecting measure of great power.

The patient is now in the stage when the use of intestinal antiseptics (or disinfectants) may be considered. Is it possible to hasten the death of the germs by the use of drugs? I believe that it is, but here we have a two-edged sword that must be used cautiously. Some of the intestinal antiseptics are theoretically powerful, but are too irritating to the mucosa to be used in a dose large enough to have any value. I look on thymol, the naphthol derivatives and phenyl salicylate, or salol, as in this class. Bismuth salicylate I have found unobjectionable from this point of view, and a comparison of two series of cases, one treated solely by the starvation-plan and one treated with bismuth salicylate showed such a decided difference in favor of the drug, that it seemed to have undoubted disinfectant properties, which Steele's careful investigations proved mathematically. Besides the direct disinfectant action of the salicylic radical there is also obtained the sedative action of bismuth itself, which may also be enhanced by giving the subnitrate or the subcarbonate at the same time. This sedative property may also be said to have an indirect disinfectant action, such as may be attributed to de-

coctions of the carbohydrates, like barley water or rice water. As already stated, these favor fermentation by the saccharolytic germs, which seem clinically to aid in shortening the inflammatory period so positively as to possess antagonistic action on the pathogenic germs.

I feel it my duty to sound one word of warning as to the use of calomel in these cases. I use it rarely because of its possibilities for harm, and the more I see of its use by my colleagues the more disinclined I am to use it. Certainly the sickest infants I saw last summer with enteritis had had in the preceding twenty-four hours a grain of calomel in divided doses. In much smaller doses, one-twenty-fourth of a grain every three hours for four or five doses, it may be of service, but it is a much slower evacuant than oil, rhubarb or magnesia (the citrate or sulphate). And if its antiseptic action depends on its conversion into the bichlorid, then, as Dr. Wood pointed out in the opening paper of this symposium, to have any value it must be present in such amount as would seem to be irritant if not positively toxic.

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LEUKOCYTOSIS IN EXPERIMENTAL MEASLES.—L. Hektoen and H. E. Eggers (*Journal of American Medical Association*, October 12, 1911) find that in the monkey the leukocytes behave much as they do in human measles. Preceded by a more or less distinct leukocytosis, there occurs a leukopenia of variable degree corresponding in a general way to the latter part of the preeruptive and the early part of the eruptive period. As to the question whether the leukopenia may not be the result of the injection of foreign blood and connected with the resulting processes of antibody formation and sensitization, the authors state that, while further observations are necessary to settle this point, it may be said that in monkeys injected with human blood for other purposes and in still larger quantities they have noticed either no leukopenia or a transient, very slight diminution in the count. Hence it is concluded that the leukopenia observed in two or three of the experiments represents a reaction to the measles virus.—*Medical Record*.

# THE OCCURRENCE OF VENOUS HUMS IN CHILDREN.\*

BY H. R. M. LANDIS, M.D.,

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AND

ISADORE KAUFMAN, M.D.,

Physician to the Dispensary of the Phipps Institute of the University of Pennsylvania.

The occurrence of murmurs in the veins was first noted by Laennec (Treatise on Diseases of the Chest and Mediate Auscultation, American Edition, 1830, page 567), who, however, erroneously placed the site of the murmurs in the arteries. Bouillaud (*Traite Clinique des Maladies du Coeur*, etc., Paris, 1835) who first associated the murmur with anemia, and gave to it the name *bruit de diable* (from its resemblance to the sound produced by the toy humming or spinning-top) also held that it was produced in the arteries. Hope (Diseases of the Heart and Great Vessels, Third Edition, 1839) an English clinician, asserted that he too, and independently of Bouillaud, noted the association of the murmur with anemic conditions. The term venous hum, by which the murmur is now generally known was given it by Hope, who expressed a certain "squeamishness" at the portentuous term *diable*.

The true site of the murmur was first pointed out by Ogier Ward (London Medical Gazette, Vol. XX., page 9, 1837), of Birmingham, England, in 1837. Among the reasons he gave in support of his theory were: That pressure of the stethoscope increased the murmur without altering the arterial pulse; that everting the head with the chin raised, and thus diminishing the calibre of the vein, acceleration of the blood current was produced and that by reversing this manœuvre the vein was shortened and the murmur disappeared or was diminished in intensity.

The term venous hum is usually understood to refer to the murmur occurring in the jugular veins, although it may also, under unusual conditions, be heard in other situations. Eustace Smith has described a murmur heard over the upper part of the sternum which is supposed to be produced by the pressure of en-

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\* Read before the Philadelphia Pediatric Society, December 12, 1911. For discussion, see page 148.



larged bronchial lymph nodes on the left innominate vein, which passes from left to right with a slight obliquity downwards, behind the upper part of the sternum. The diagnostic value of this sign is extremely doubtful. Walshe (*Diseases of the Heart and Great Vessels*, First American Edition, 1862), stated that next to the jugular and subclavian veins the venous hum was most frequently heard in the femorals, usually under the same conditions in which the jugular murmur occurred. In some instances he heard the hum over the femorals when it was absent over the jugulars. This statement, however, we were unable to verify. Thayer (*American Journal of Medical Science*, Vol. CXLI., 1911) has recently reported the occurrence of a venous hum at the ensiform cartilage, in an individual with cirrhosis of the liver, and J. N. Henry (*American Journal Medical Sciences*, January, 1912) has observed a similar case.

While there is now no doubt as to the venous origin of these murmurs recent observers do not agree as to whether those heard in the neck are produced in the internal or external jugular veins; the majority, however, place them in the internal jugulars.

The venous hum is a continuous murmur, sometimes loud and coarse, at others low pitched and soft; and occasionally it has a musical sound. While continuous it has a rythmical systolic and diastolic intensification, especially the latter, and the sound is also louder during inspiration. The point of maximum intensity is a triangular space posterior to the sternomastoid muscle, and having as its base the inner third of the clavicle. It is as a rule, heard most frequently on the right side, but may be heard on the left side only. It very frequently exists on both sides.

The murmur in the jugulars is first heard in the upright position, and as a rule disappears or is greatly diminished in intensity when the patient assumes the recumbent posture. Altering the position of the head also is a factor in bringing the murmur out or of increasing its loudness, if already present. Austin Flint (*Bellevue and Charity Hospital Reports*, 1870) insisted that changing the position of the head was not a factor in producing the murmurs unless anemia was present, and Maguire (*Clinical Journal*, Vol. XVI., 1900) writing more recently of the frequency of the venous hum in anemic individuals, makes the same statement.

The causation of the venous hum is obscure. The one factor



that seems to be constant under all circumstances is that of gravity inasmuch as the murmur nearly always disappears, or is greatly diminished by the recumbent posture. Alteration of the specific gravity of the blood or other changes incident to anemia have been cited, as entering into the production of the murmur; this theory fails, however, in explaining its occurrence in healthy children and adults without anemia. For the same reason the sudden widening of the jugular as it enters the subclavian vein is unsatisfactory as this anatomical factor exists in every individual.

In recent years the most generally accepted explanation is that relating to the putting of the veins on a stretch. By having the patient turn the head upwards and away from the side auscultated the internal jugulars are made tense and compressed against the transverse processes of the lower cervical vertebra with which they are in relation. In this way the calibre of the vein is narrowed and the flow of the blood current accelerated. Furthermore, turning the head too far stops the murmur, probably because compression sufficient to occlude the vein is exerted. Increasing the tension of the sternocleido and other muscles in the neck has also been given as a possible cause of exerting pressure on the internal jugular.

This theory fails for the reason that the murmur is frequently heard with the head held straight. Flint and Maguire's statement that anemia must be present has been referred to.

Nowadays the venous hum has lost most of its diagnostic significance, but prior to the introduction of instruments for determining the degree of anemia, the presence of a murmur in the jugular veins was of real value. That it is no longer considered of great importance is shown by the omission of any mention of the subject in many modern journal articles and text-books dealing with the anemias. Austin Flint (*Diseases of the Heart*, Second Edition, 1870, page 469) believed the presence of a venous hum was an aid in determining the organic or functional character of murmurs heard at the base of the heart.

Sawyer (*British Journal of Diseases of Children*, July, 1910) and Coombs (*Ibid*, March, 1911) have recently contributed articles on the occurrence of venous hums in children. The former examined 500 children, from two and a half to twelve years of age, for the presence of Eustace Smith's sign. He encountered the murmur in sixty-five instances, and in all but one

of them it was heard loudest over the jugulars. In 48 of these cases in which the maximum intensity was noted, he found the hum loudest on the right side in five, on the left in ten, of equal intensity on both sides in thirty; in only one instance was it loudest over the sternum. He, therefore, concludes that the murmur is produced in the internal jugulars and is conducted downwards to the sternum, as it is more likely for the bruit to be conducted in the direction of the blood current than that it should travel against it. Furthermore, if the bruit heard over the sternum be produced in the left innominate vein by reason of the vein being pressed upwards by enlarged lymph nodes, as Eustace Smith supposes, any conduction of the murmur backward along the vein would be expected to show itself over the left internal jugular and subclavian. Inasmuch as the murmur is heard frequently on both sides and sometimes on the right side only, he concludes that the hum over the sternum is of no significance. In an examination of 100 children, under fifteen years of age, Coombs heard a venous hum in the jugular veins in fifty-one. He encountered it most frequently in children between the ages of six and ten years. A general examination of individuals over sixteen years of age showed that the venous hum was unusual, apart from a few cases of chlorosis and other general anemic states.

Our observations are based on a study of 99 children under fifteen years of age and 26 adults; the adult group consisting of individuals with moderately or far advanced tuberculosis. Most of the children were brought to the Phipps Institute for examination because of actual or suspected tuberculosis in some member of their family; in some instances the child itself was ill.

In regard to the question of the presence or absence of tuberculosis in these children, 81 were classed as being clinically non-tuberculous; 41 were given the von Pirquet test; 18 were positive; 20 were negative and 3 doubtful. Fourteen showed clinical evidence of tuberculosis, in 7 the von Pirquet test was positive, in 4 it was negative and in 3 there was no record. Four were considered as being probably tuberculous; the von Pirquet test was positive in 2, negative in 1, and in 1 there was no record.

Hemoglobin estimations were made in 14 only, the hemoglobin ranging from 90 to 60 per cent. The estimate of the degree of the anemia formed by inspection of the skin and mucous membranes coincided fairly accurately with the hemoglobin readings.

The hum was associated with other murmurs in four instances. In one child there was a systolic murmur at the apex of the heart; in three there was a systolic murmur in the carotids, in two it was heard on the right side and in one on the left side. In two instances the murmur in the carotid artery was heard only when the child assumed the recumbent posture. The children with both venous and arterial murmurs were classed as being not anemic.

The following table shows the frequency of the hum at the different age periods and its relation to anemia:

Age	Cases	Hum Present	Anemic	Not Anemic
0-5	14	13 (92.9%)	6	7
6-10	54	47 (87 %)	20	27
11-15	31	24 (77.4%)	13	11
<hr/>		<hr/>	<hr/>	<hr/>
Total...	99	84 (84.8%)	39 (46.4%)	45 (53.6%)

These results show that so far as children are concerned the question of whether they are anemic or not seems to have very little relation to the production of the murmur, the difference between the anemic and nonanemic being very slight.

Of the eighty-four children in which the hum occurred it was loudest on the right side in forty-two (50 per cent.), on the left in seventeen (20 and two-tenths per cent.), and in twenty-five (29 and eight-tenths per cent.) it was heard equally well on both sides.

Eustace Smith's sign was not obtained in a single instance of some 30 cases in which it was looked for. The children examined for this sign were those in whom there was a suspicion that undue enlargement of the bronchial lymph nodes might exist, that is, children with marked hypertrophy of the superficial lymph nodes, undue prominence of veins over the chest wall, and in a few instances there was a harsh long-standing cough.

In regard to the question of altering the position of the head and the influence of posture on the production of the murmur, it was noted that in those with anemia the murmur was heard with the head held straight in thirteen instances and in twenty-six everting the head brought the murmur out. In the non-anemic children the murmur occurred in thirteen instances with the head held straight, while in thirty-two turning the head produced a murmur.



Changing the position of the child from an upright to a recumbent posture caused the murmur to disappear in sixty-eight (81 per cent.) instances, and in sixteen (19 per cent.) the murmur persisted, but usually much diminished in intensity. It is to be noted that the presence of anemia seemed to have some influence in the persistence of the murmur when the recumbent posture was assumed, thus the murmur disappeared in 93 and three-tenths per cent. (forty-two out of forty-five) the non-anemic children, while in the anemic it disappeared in only 66 and seven-tenths per cent. (twenty-six out of thirty-nine).

In a few instances, when the murmur occurred on both sides, the recumbent posture would cause a disappearance of the murmur on one side only.

We were unable to establish any relationship between tuberculosis and the murmur, as a matter of fact 85 and seven-tenths per cent. of the murmurs occurred in children classed as non-tuberculous.

In the 26 cases over sixteen years of age a venous hum was noted in three when the head was turned. These 3 cases were moderately advanced cases of tuberculosis, two being noted as anemic and one not so.

In conclusion we may say that so far as our observations go the venous hum is present in the majority of children under fifteen years of age, tending to diminish in frequency as that age is reached, and finally disappearing. The only relationship we could establish between the murmurs and anemia was that it had less tendency to disappear in the recumbent posture when anemia was present.

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DIPHtheria ANTITOXIN AND ANAPHYLAXIS.—J. A. Roddy states that a first injection of horse serum into man is innocuous; anaphylaxis is rarely manifest after a subsequent injection, and when it occurs complete recovery usually follows. The danger of anaphylaxis is insignificant in comparison with the danger of diphtheria. The necessity of administering a second dose of diphtheria antitoxin, and consequently the occurrence of anaphylactic phenomena can be almost, if not entirely, avoided by the proper administration of the first dose.—*Medical Record*.



## DIPHThEROID BACILLI OF THE PENIS, WITH REPORT OF 2 CASES OF DIPThERIA FOLLOWING CIRCUMCISION.\*

BY JOHN A. KOLMER, M.D.,

Philadelphia, Pa.

Diphtheria of the penis is comparatively rare, but surgeons should remember that such infection may follow circumcision and, if unrecognized, be a source of considerable mischief in spreading the disease. Diphtheroid bacilli may be found about the genitals of both sexes, and are especially noted in the examination of vaginal smears. These bacilli are apparently harmless and analogous to the bacilli found in the throats of bacillus carriers. The present study was suggested by the development of 2 clinical cases of diphtheria of the penis in the Children's Hospital and referred to me for bacteriologic examination. While extensive studies have been made of the throat in reference to bacillus carriers, our knowledge of this question in reference to the penis is quite meagre, and it occurred to us that additional investigation may be of value. Wesbrook's classification of diphtheria bacilli is very useful and was adopted in this study. Early in the work we were surprised to find such a large percentage of normal organs yielding cultures of diphtheria-like bacilli, and especially so, many showing the banded types of bacilli which are decidedly uncommon in the throat cultures in this part of the country. The object of our study was threefold:—

*First.*—To study diphtheroid bacilli of the penis under normal conditions, ascertaining the percentage in which they are present and their classification according to types.

*Second.*—A bacteriologic examination of a number of cases of circumcision before and after operation to ascertain if they may become pathogenic under these conditions.

*Third.*—A report of 2 cases of diphtheria of the penis with culture examinations.

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\* From the laboratories of the Philadelphia Hospital for Contagious Diseases and Children's Hospital. Read before the Philadelphia Pediatric Society, December 12, 1911. For discussion, see page 147.

In addition to recording types, many cultures were tested for acid production with the various sugars and for virulence by animal inoculation.

## PART I.

*Technic.*—In carrying out the first part of the work, cultures were made by means of sterile swabs on coagulated blood serum from 100 boys, varying in age from six months to eighteen years, and all apparently healthy. The prepuce was retracted and cultures made by swabbing about the glans penis, especially about the corona. No ultra-urethral cultures were made. Cultures were then incubated at 35° C. for eighteen hours, and then smears prepared and stained with Loeffler's methylene blue in the usual manner.

*Results.*—Cultures from 40 of the 100 boys showed the presence of diphtheria-like bacilli. Of considerable interest here was the question of the types of bacilli found, since many bacteriologists hold certain types according to Wesbrook's classification and discard the balance. In these cultures, types were recorded according to the predominant organism present:—

Type C <sub>2</sub>	present in	22.5	per cent. of cases.				
Type C <sub>1</sub>	"	"	20.0	"	"	"	"
Type B <sub>2</sub>	"	"	20.0	"	"	"	"
Type C	"	"	17.5	"	"	"	"
Type D <sub>2</sub>	"	"	12.0	"	"	"	"
Type F <sub>2</sub>	"	"	5.5	"	"	"	"
Type A	"	"	2.5	"	"	"	"

It will be noted that 7 of Wesbrook's 21 types were found. Of these, A and C are generally regarded as true diphtheria bacilli and are given a positive diagnosis. Twenty per cent. of the cultures were of these types, and all were from absolutely normal organs. Among the types considered as "doubtful" by those who diagnose according to this classification are types B<sub>2</sub>, C<sub>1</sub>, C<sub>2</sub>, which represent 62.5 per cent. According to the same method certain types are disregarded entirely and among these types D<sub>2</sub> and F<sub>2</sub>, representing 17.5 per cent. of our cultures.

A number of these cultures were isolated and their acidifying action on sugar media determined and their virulence tested by animal inoculation. The results of these are given consideration in Part II.

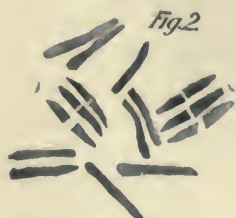
## TYPES OF BACILLI FOUND IN THE NORMAL PENIS.



TYPE A.



TYPE C.

TYPE B<sub>2</sub>TYPE C<sub>1</sub>.TYPE D<sub>2</sub>TYPE C<sub>2</sub>TYPE F<sub>3</sub>

Type C <sub>2</sub>	present	in	22.5	per cent.	of cases.
Type C <sub>1</sub>	"	"	20.0	"	"
Type B <sub>2</sub>	"	"	20.0	"	"
Type C	"	"	17.5	"	"
Type D <sub>2</sub>	"	"	12.0	"	"
Type F <sub>2</sub>	"	"	5.5	"	"
Type A	"	"	2.5	"	"

## PART II.

Ten circumcision cases were cultured just before operation and again upon the first visit to the dispensary for dressing, usually from twenty-four to seventy-two hours after operation. Of these 10 cases, 5 to 50 per cent. showed the presence of bacilli before operation. Three of these cases showed the presence of type  $C_1$  and one each of types  $C_2$  and  $B_2$ . All of these fall under the class of "doubtful" organisms. Two cultures of these same cases after operation were positive, showing the presence of type  $C_1$ . All of these cases recovered from the operation and in the usual manner.

Ten of the positive cultures of normal organs and two of the circumcision cases were isolated and their acidifying action with the various sugars determined by inoculating Hiss serum water media containing 1 per cent, respectively, of the following sugars: Glucose, saccharose, dextrin, mannite, levulose, lactose and inulin. Cultures were then incubated at 37°C. for six days, and the following results noted:—

TABLE I. ACID PRODUCTION TESTS.

Number of Culture	Type of Organism	Glucose	Saccharose	Dextrin	Mannite	Levulose	Lactose	Inulin
39	A	+	—	?	—	—	—	—
44	C	—	—	—	—	+	+	—
35	C	—	—	—	—	+	?	—
27	$C_2$	+	±	—	—	—	—	—
43	$C_2$	—	—	—	—	—	—	—
17	$C_2$	+	—	—	—	—	—	—
26	$D_2$	—	—	—	—	—	—	—
40	$D_2$	—	—	—	—	—	—	—
12	$C_1$	—	—	—	—	—	—	—
42	$C_1$	—	—	—	—	+	—	—
Circumcision, 2	$C_2$	+	—	—	—	?	—	—
After circum- cision, 3	$B_2$	—	—	—	—	—	—	—
Case 1	C	+	—	+	—	+	—	—
Case 2	B	+	—	+	—	—	—	—

The cultures used in these and the virulence tests were of organisms retaining their type after being secured in pure culture. Absence of acid production with all sugars is characteristic of



*B. hofmanni*, while diphtheria bacilli characteristically produce acid with glucose, dextrin, levulose and lactose. The fact that cultures 39, 27, 17 and from circumcision case No. 2 produced acid with glucose would render them suggestive of diphtheria bacilli, although the uniform absence of sugar production with the other sugars would classify them rather with pseudodiphtheria bacilli. An extensive experience with acid production tests in the Philadelphia Hospital for Contagious Diseases with bacilli from clinical contact and carrier cases of diphtheria has led us to abandon these tests in so far as practical value is concerned. The reactions of virulent diphtheria bacilli are not uniform by any means, although we have generally found a bacillus virulent for the guinea-pig to produce acid with some of the sugars.

Ten of these cultures, Nos. 39, 35, 27, 43, 26, 40, 12, 42 and Nos. 2 and 3 of the circumcision cases, were tested for virulence by animal inoculation. Cultures were planted in slightly alkaline broth containing 1 per cent. glucose and grown for forty-eight hours at 37.5° C. Healthy guinea-pigs were selected, weighing about 250 and not over 300 grams, and the dose, 0.5 per cent. of the body weight of the pig expressed in cubic centimeters, injected subcutaneously in the median line of the abdomen.\* The animals were observed for four days, and in none were there any evidences of toxemia or subsequent paralysis.

TABLE 2. GUINEA-PIG TESTS.

Number of Culture	Source	Type	Growth in Alk. Broth	Weight of Pig in Grams	Dose c. c.	Results
39	Normal penis	A	48 hours	260	1.30	No toxemia. Negative
35	Normal penis	C	48 hours	300	1.50	No toxemia. Negative
27	Normal penis	C <sub>2</sub>	48 hours	262	1.31	No toxemia. Negative
43	Normal penis	C <sub>2</sub>	48 hours	281	1.40	No toxemia. Negative
26	Normal penis	D <sub>2</sub>	48 hours	246	1.23	No toxemia. Negative
40	Normal penis	D <sub>2</sub>	48 hours	270	1.35	No toxemia. Negative
12	Normal penis	C <sub>1</sub>	48 hours	270	1.35	No toxemia. Negative
42	Normal penis	C <sub>1</sub>	48 hours	282	1.41	No toxemia. Negative
2	Before circumcision	C <sub>2</sub>	48 hours	291	1.46	No toxemia. Negative
3	After circumcision	B <sub>2</sub>	48 hours	288	1.44	No toxemia. Negative

\* Weston, P. G., and Kolmer, J. A. Guinea-pig Test of the Virulence of Diphtheria Bacilli. *Journal of Infectious Diseases*, Vol. VIII., No. 3, 1911, 295-301.

## PART III.

Cases of diphtheria of the penis have been reported by McCollum, Post, Barranikow and Munn. No doubt many other unreported cases have occurred. Pfeiffer and Graham-Smith have noted the occurrence of diphtheria-like bacilli in the male urethra. Of special interest in this connection are the reports of Robertson and McRae, who claim that the diphtheroid bacilli which they found on the surface of the urethra from cases of general paralysis and tabes dorsalis were the cause of these diseases. While we have had no experience with these conditions, yet we believe that they may have been working with the same bacilli which we found on the normal penis as early as six to eight weeks of age.

I am indebted to Dr. J. H. Jopson, Surgeon to the Children's Hospital, and Dr. S. S. Woody, Chief Resident Physician to Philadelphia Hospital for Contagious Diseases, for the privilege of including notes from clinical histories of the following 2 cases:—

CASE I.—John C., age eighteen months; circumcised in the surgical out-patient department of the Children's Hospital on May 3, 1911. Two days later the child was brought to the dispensary with great swelling and edema about the wound, with the formation of a light grayish-white exudate about a quarter of an inch in diameter. Smear and culture were submitted to me for examination. The culture showed the presence of almost a pure growth of diphtheria bacilli belonging to type C. On May 13th the patient was sent to the Philadelphia Hospital for Contagious Diseases, where we continued to examine subsequent cultures. The original culture was isolated without any difficulty, grown in alkaline broth for forty-eight hours, and 1.42 c.c. injected subcutaneously in a 285 gram guinea-pig. Death resulted in forty-eight hours, and repetition of the test with antitoxin proved death to have been caused by these bacilli. At the hospital the patient received 7,200 units of antitoxin, and sixteen days later the wound had healed completely. The cultures, however, continued to show the presence of diphtheria bacilli for fifty-one days, when finally two consecutive cultures were found negative and the patient discharged from the hospital. While in the hospital pig-tests were repeated on the tenth and thirtieth day of the disease and both were positive. The same cultures tested with antitoxin proved them to be virulent diphtheria bacilli.

The culture isolated on the tenth day of the disease was tested for acid production with the various sugars and showed positive results in five days with glucose, galactose, levulose and dextrin.

CASE II.—Leonard R., aged two years; circumcised in the Children's Hospital, May 12, 1911. A few days later the circumcision wound was somewhat ulcerated and it was noticed that the child's urine was bloody. Some intra-urethral infection was suspected, and we were requested to make bacteriologic examination. Cultures yielded almost a pure growth of diphtheria bacilli of type B. The patient was admitted to the diphtheria department of the Philadelphia Hospital for Contagious Diseases on May 26, 1911. The prepuce at this time was ulcerated over a considerable area and bled easily. No definite membrane was seen at any time. The patient received 4,800 units of antitoxin, and about twenty-four days later was completely recovered. Cultures continued to show diphtheria bacilli for thirty-five days when, with two consecutive negative cultures, the patient was discharged. A pig-test done on June 4th, or nine days after admission, proved to be virulent. This culture produced acid with dextrin, glucose, lactose and galactose.

Neither of these cases showed at any time any evidences of diphtheria of the throat or nose. Case I. was quite typical of clinical diphtheria of the prepuce, while Case II. was rather atypical and did not at any time show the presence of a membrane.

#### CONCLUSIONS.

1. By the term "diphtheroid bacilli" we refer to a group of organisms morphologically similar to diphtheria bacilli, but without virulence when tested by animal inoculation. Such organisms, representing seven different types of diphtheria bacilli according to Wesbrook's classification, were found in 40 per cent. of cultures of the penis of 100 boys with healthy organs. Of these, 20 per cent. were beaded organisms, members of Group 1, and resembling true diphtheria bacilli; 62.5 per cent. were of Group 2 and regarded as "doubtful," and 17.5 per cent. were of Group 3 and regarded as negligible by those diagnosing according to Wesbrook's classification. None of the cultures of the three groups gave the commonly accepted sugar reaction for diphtheria bacilli and all were avirulent for guinea-pigs.

2. Diphtheria-like bacilli may be present on the circumcision



wound for some time after operation and in the large majority of instances produce no harmful effects. However, the possibility of true diphtheria of the prepuce under such conditions must be borne in mind. The organisms found in the true cases of diphtheria resembled those found on healthy organs in every morphological particular and demonstrate the fact that as far as the bacteriologist is concerned he must render a positive diagnosis on morphological characteristics, as acid production tests with the various sugars and animal inoculation tests consume many days. The final disposition and treatment of a case should take the clinical aspect into consideration.

I wish to express my thanks to Drs. Speese, Lee, Gill, Montgomery and Kinloch of the surgical dispensary staff of the Children's Hospital for the cultures of the circumcision cases.

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THE PHYSIOLOGY OF THE MILK SECRETION.—Cramer says (*Münch. med. Woch.*, July, 1909) that the development of the mammae is dependent upon the functioning of the ovaries. He reports 2 cases in point. The first was a case of sexual infantilism in a woman of thirty-one, in which the breasts were entirely undeveloped. In the second case, a girl of twenty-one years, with infantile genitalia and a history of complete amenorrhea, there was also apparent lack of mammary tissue. In this woman implantation of ovaries from another woman caused the appearance of regular menstruation and the definite development of the breasts. From this he concludes that the growth of the breasts at puberty is dependent upon some material produced in the functioning ovary. . . . Occasionally milk secretion appears in virgins at the menstrual period. Sellheim has shown that by the laying on of an infant during pregnancy the milk secretion can be produced, and Kehrler that repeated suckling of the male breast will cause it to swell and secrete a rich supply of milk. When a woman has been obliged to stop nursing for several weeks and the milk supply has dried up, the returning of the infant will often cause a renewed secretion. From these facts Cramer concludes that we must recognize a definite relation between the act of suckling and the functioning of the breast, and that the mammary gland at the end of puberty becomes definitely dissociated from the other genital organs, and that when suckling calls for it, it can take up its functions without the influence of any other stimulus.—*Medical Record.*



# AN ATYPICAL CASE OF ACUTE EPIPHYSITIS IN AN INFANT, WITH X-RAYS.\*

BY JOHN F. SINCLAIR, M.D.,

AND

HENRY K. PANCOAST, M.D.,

Philadelphia, Pa.

Harry J., born January 9, 1911, was the third child of healthy parents. The mother has had no miscarriages. The oldest child was in good health. The second child was recovering from diph-

theria when Harry was born. The child with diphtheria was isolated in the front room of a two-story house, with a trained nurse in attendance; while the mother, newborn baby and the trained maternity nurse were in the room at the back of the second story. The diphtheria began on December 17, 1910.

Harry weighed six pounds at birth, and was a normal and healthy infant to all appearances. His progress was uneventful and satisfactory for eight weeks. The umbilicus was to all appearances healthy. The cord separated about the seventh day, and the navel wound healed rapidly. He was jaundiced. There were never any skin lesions, such as eczema, furuncles, etc.



NORMAL RIGHT FOREARM AND WRIST AT TIME OF FIRST EXAMINATION—AGE, 2 MONTHS.

On March 8th (almost two months old) it was noticed that he was restless, had little desire for the breast milk, cried when handled, and did not move his left arm. The symptoms seemed

\* Read before the Philadelphia Pediatric Society, December 12, 1911. For discussion, see page 147.

to appear suddenly. There was no history of injury. There had been no chills, and the baby had not vomited.

I saw the baby within six hours of the first appearance of symptoms.

*Physical Examination.*—He was well developed and nourished. His color was rather pale. There was no rigidity or tenderness of the neck and no neck sign. The pupils were equal and reacted to light. The mucous membranes of the throat and mouth were apparently normal. The heart, lungs and abdomen were normal. The liver was palpable two centimeters below the costal margin in the nipple line. The spleen was not palpable. The extremities were normal except for the left arm. The left arm was not moved. The child cried when it was touched as if there was tenderness on palpation, and pain on motion. Swelling, redness, and heat were not noted at this time. There was no spasm or paralysis. The knee jerks were equal and normal. Kernig's sign was not present. One small gland was found to be slightly swollen in the left axilla. The other peripheral glands were not palpable. The temperature was  $101\frac{2}{3}^{\circ}\text{F.}$  in the rectum, and the pulse 140. Unfortunately, a leukocyte count was not obtained.

*Diagnosis.*—Tuberculosis was eliminated from the possibilities on family history, age of patient, and sudden onset. Syphilis



LEFT FOREARM AND WRIST—FIRST EXAMINATION—MARCH 10, 1911.  
AGE, 2 MONTHS.

Lower epiphysis of Radius has not started to ossify.

NOTE: Apparent necrosis of lower half or more of diaphysis of Radius, with formation of *involucrum*. Shortening. Subperiosteal thickening of adjacent part of diaphysis of ulna.

was eliminated on family history, and the absence of any other evidences of congenital syphilis—such as fissures, mucus patches, coppery discolorations of the skin, coryza and rhagades oris.

Rheumatism is so rare a condition at such an early age that it is hardly worthy of more than passing thought. Scurvy is eliminated by the sudden onset, the temperature, and the localization of the process in one extremity, as well as by the absence



SECOND EXAMINATION — THREE WEEKS AFTER FIRST—MARCH 31, 1911. AGE, 11 WEEKS.

NOTE: Lower end of diaphysis of Radius has disappeared, and shortening is more marked. Proliferation and thickening have advanced a little further up on the ulna.

of the swelling and sponginess of the gums, the ecchymoses and hemorrhagic lesions.

Gonorrheal infection is referred to by Holt, but in this instance there had been nothing which would cause us to seriously consider such a possibility.

A diagnosis of acute epiphysitis was therefore made by exclusion and a radiograph was requested.

When seen on the following day there was moderate fever, rapid pulse, pain and tenderness in the left forearm, with swell-

ing, slight redness, and slight heat, but no sense of fluctuation. The swollen gland in the left axilla was somewhat more noticeably enlarged. There was no red line of lymphangitis present. The infant cried when handled, and did not move the left arm.

The radiograph showed a marked destruction of the shaft of the radius, which was the seat of an acute osteomyelitis.

Dr. John H. Jopson saw the case, at my request, on the afternoon of the 11th, at which time the symptoms as detailed above were well marked.

The diagnosis of acute epiphysitis was confirmed by the consultation.

The origin of the infection was obscure, but the virulence of the infecting organism was evidently of a low grade, as there was no fluctuation demonstrable at any time, nor were there other signs of a definite collection of pus.

Did the mother unwittingly harbor the Klebs-Löffler bacilli, and were these organisms carried to the fetus through the maternal circulation?

Or did some pyogenic organism of low virulence gain entrance through the umbilicus, the mucous membranes, the skin, etc?

To these important questions we can give no definite and certain answers.

The treatment instituted was simply fixation on a light cardboard splint and the use of a bland antiseptic ointment. At the first signs of pus it was determined to hand the case over to the surgeon for operation. This necessity never presented itself,



THIRD EXAMINATION — SEVEN  
WEEKS AFTER FIRST —  
APRIL 28. AGE,  
15 WEEKS.

Progress of disease checked. Partial regeneration of lower end of diaphysis of Radius, supposed involucrum disappearing, leaving shaft slightly thickened. Thickening of ulna subsiding.



and after four months of fixation, at first absolute and later modified, the radiographs, by which we had been guided throughout in our treatment, proved that we had accomplished our desired end-result.

#### RADIOGRAPHIC OBSERVATIONS.

BY HENRY K. PANCOAST, M.D.

The first X-ray examination was made March 10th, about



FOURTH EXAMINATION—ELEVEN WEEKS  
AFTER FIRST—MAY 26, 1911.  
AGE, 19 WEEKS.

Further regeneration of lower end of diaphysis of Radius; only evidence of supposed involucrum is slight thickening of shaft; shortening less. Ossification beginning in lower epiphysis. (A favorable sign, but too early.) Appearance of ulna practically normal.

forty-eight hours after the first evidences of the local condition became manifest. The child had then reached the age of two months. The clinical picture was that of an acute epiphysitis, supposedly at the lower end of the radius, the diagnosis having been based upon the sudden onset, extensive and marked swelling, with some redness and heat. There was hardly the usual extreme tenderness and pain, nor was the temperature quite so high as is usually noted during the acute stage of this condition. A large gland was distinctly evident in the axilla.

The radiographic appearance was that characteristic of a

necrosis following some time after the acute stage of an acute pyogenic epiphysitis. The lower end of the diaphysis of the

radius was partially destroyed, resulting in some shortening, which was quite evident on comparison with the radiograph of the sound wrist. Most, if not all, of the lower half of the diaphysis had become enveloped by an involucrum, and the appearance strongly suggested a necrosis of the enclosed shaft. The adjacent surface of the ulna showed some subperiosteal thickening. While characteristic of the results of an acute pyogenic process, still all of the appearances could be interpreted as conforming with a rapidly destructive type of syphilitic osteomyelitis, and in fact, an absolutely certain distinction between these two conditions in this case, by the radiograph alone, was practically impossible. Tuberculosis could be excluded radiographically as well as clinically. As congenital syphilis was practically ruled out clinically, the radiographic findings throughout have been interpreted as indicative of the results of an acute epiphysitis of pyogenic origin.

The fact that there were no clinical evidences of disease whatever until two days before the first X-ray examination does not conform with the X-ray findings. It would be absolutely impossible for such extensive bony destruction and new bone formation as were then demonstrated to have occurred within two days. In view of the stage of the disease indicated, the primary acute stage of the process must undoubtedly have had its onset at least as far back as before birth, or soon after, at the latest. In this connection, we must not overlook the presence of a diphtherial infection in the household just prior to the birth of the



FIFTH EXAMINATION — SEVENTEEN WEEKS AFTER FIRST—JULY 7, 1911. Age 25 WEEKS.

Appearance of radius nearly normal, except for some shortening still (although this is becoming less marked), and some thickening at the epiphyseal end. No evidence remains of the involucrum. Epiphyseal ossification has progressed, and the centre has appeared in the os magnum. (Perhaps a little early.)

child as a possible etiologic factor. Practically the only way in which the clinical aspect of the case and the X-ray findings could be made to conform would be to assume that the apparent sudden onset of the acute stage of the disease two days before the first X-ray examination was, in reality, the manifestation of a sudden reawakening of a pyogenic infection that had remained quiescent for some time after the subsidence of a previous acute stage.



SIXTH EXAMINATION—THIRTY-ONE WEEKS AFTER FIRST—AGE, 39 WEEKS.

Radius nearly normal length, and thickness has practically disappeared. Ossification progressing rapidly. Centre has appeared in unciform. (Normal time.)

The second examination, made three weeks later, showed still further destruction of the lower end of the diaphysis of the radius, and further shortening. The ulnar thickening had increased somewhat.

The third examination, made seven weeks after the first, showed not only a cessation in the progress of the disease, but, in addition, a rather unusual process of regeneration in the structures involved. There was partial regeneration in the lower end of the diaphysis of the radius, and the supposed involucrum was beginning to disappear, leaving the shaft somewhat thickened in appearance. The thickened

portion of the ulna had assumed almost normal proportions.

The fourth examination, eleven weeks after the first, showed still further regeneration at the lower end of the radius, and complete disappearance of the supposed involucrum, only some slight thickening of the shaft and some shortening remaining. The appearance of a centre of ossification in the lower radial

epiphysis was another favorable sign, tending materially to lessen the fear of serious results likely to follow in such cases from the interference with the subsequent epiphyseal growth and development of the bone. Although ossification in this epiphysis does not usually begin before the end of the second year, premature ossification is not an unusual accompaniment of chronic disease in neighboring bone or joint structures. The very rapid regeneration of bone shown in this case is an example of the great activity of epiphyseal development at the lower end of the radius.

The fifth examination, seventeen weeks after the first, showed the radius normal in appearance, except for some shortening, which was rapidly decreasing, and slight thickening at the epiphyseal end. Premature ossification was beginning in the os magnum.

The sixth examination, thirty-one weeks after the first (at the age of thirty-nine weeks), showed still less shortening, and an entire disappearance of relative thickening, at least. Ossification had progressed considerably in the radial epiphysis, and a centre had appeared prematurely in the unciform.

The generally favorable course of the disease, together with the unusual regeneration of the structures destroyed or apparently necrotic, and the disappearance of the other results of an apparently very destructive process, are atypical, from the radiographic standpoint, of either an acute pyogenic or the more virulent type of syphilitic lesion. However, this subsequent aspect of the case would tend more strongly to a possible syphilitic origin of the condition. If, however, we must accept a pyogenic infection as the etiologic factor, the case presents features of unusual interest, from the X-ray standpoint, for the reason that many of the essential ones do not conform with the usual characteristic features of acute pyogenic epiphysitis or osteomyelitis of childhood.

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"COMFORTER" OTITIS MEDIA.—W. H. Bowen (*Lancet*, September 9, 1911) believes that a large proportion of cases of supuration of the middle ear in infants are directly due to the comforter, which acts by introducing oral sepsis.—*Medical Record*.



# THE COMPARATIVE CALORIC VALUE OF VARIOUS FOODS USED IN INFANCY AND EARLY CHILDHOOD.\*

BY CLIFFORD B. FARR, M.D.,

Instructor in Medicine, University of Pennsylvania, etc.

The caloric method of estimating and comparing food values is so well recognized and has recently received so much attention in pediatric circles that a discussion of its advantages or a detailed consideration of its underlying principles is quite unnecessary. It will facilitate the demonstration, however, to recall

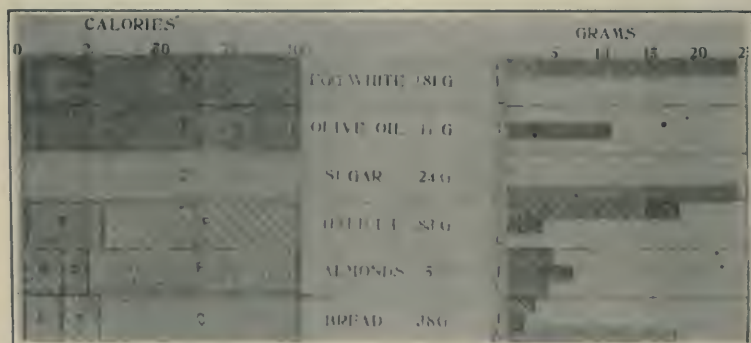


ILLUSTRATION 1.

a few points which are important for the comprehension of the tables and exhibits.

The factors usually given for calculating calories indicate in a general way the amount of heat produced by the combustion of 1 gram of protein, fat or carbohydrate, respectively. Rubner's factors, however, do not represent the actual heat of combustion in the calorimeter, but the fuel value in the human economy, after certain deductions have been made on account of lack of availability, incomplete oxydation, etc. The difference between these values is most marked in the case of protein, since on the average only 92 per cent. of the protein ingested is absorbed, and of this only 70 per cent. is completely oxidized. In the case of fat and carbohydrate, the difference is very slight. The factor for protein and carbohydrate is 4.1 and for fat 9.3.

\* Demonstration given before the Philadelphia Pediatric Society, December 12, 1911. For discussion, see page 149.

The caloric value of any food is found by multiplying the number of grams of protein, fat and carbohydrate, contained in the amount chosen, by these factors, and adding the products together. The simpler figures given by Atwater and Bryant would be preferable, but, unfortunately, almost all the tables available, including Atwater's own, have been calculated according to the older computation.

The caloric requirements vary greatly at different ages and under different conditions of work. Children and thin people require proportionately more than adults and obese persons.

Young children require relatively large amounts of protein and fat, older children and adults a larger amount of carbohydrates.

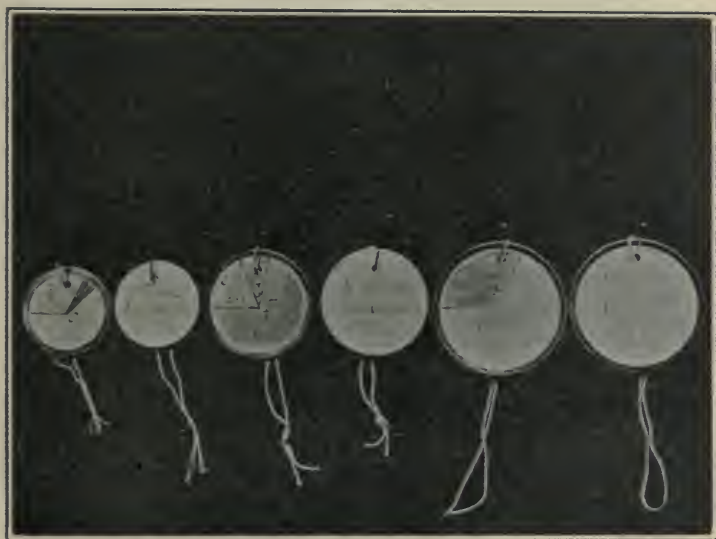


ILLUSTRATION 2.

The following table expresses these differences very clearly. (Based on values given by Koenig.) The figures, to simplify comparison, have been stated in round numbers and are only approximate (Factors 4, 9, 4) :—

	Total Cal.	P. Grms. Cal.	F. Grms. Cal.	C.H. Grms. Cal.
Child 1- 2 years ...	800	30 (120)	40 (360)	75 ( 300)
" 6-10 " ...	1,600	60 (240)	40 (360)	250 (1,000)
Adult woman .....	2,300	90 (360)	40 (360)	400 (1,600)

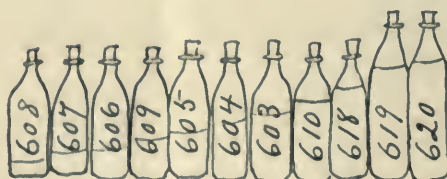
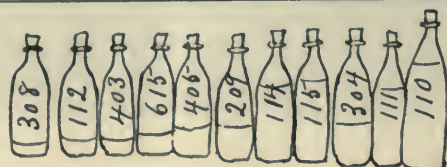


ILLUSTRATION 3.

Chittenden, in older children, and adults at least, would reduce the relative proportion of protein and increase the proportion of the other substances to make up the requisite calories.

The relative proportions given above may also be stated as "calories per cent." (Fisher.)

	P.	F.	C.H.
Child 1-2 years .....	15	45	40
" 6-10 " .....	15	20	65
Adult woman .....	15	15	70
Comparison with human milk			
(†from table) .....	†8	52	40

would seem to indicate that even in children the customary figures for protein were too high. In adults and older children the fat may be approximately doubled with a corresponding diminution in carbohydrates without endangering the nutritive balance.

By the employment of Rubner's factors the caloric value of various foods "per pound," "per hundred grams," "per ounce," or "per portion," may be readily calculated, but none of these methods affords an easy means of visualizing and memorizing food values. In 1906 Professor Irving Fisher suggested that various foodstuffs might be divided into units, each of which would be capable of furnishing 100 calories. He prepared tables indicating the amounts by weight of various substances which would constitute such units and also tabulated the percentage of calories produced by each constituent. I have modified his tables by adding in most instances the amount of protein, fat and carbohydrate contained in each unit, to facilitate the calculation of the total amount of any one of these constituents in a day's ration. This method of Fisher's renders a comparison of different foods easy, by making the most important standard a fixed quantity, just as in the dietetic treatment of diabetes it has been found convenient to arrange food portions with reference to a fixed carbohydrate content. It so happens, fortunately, that portions of 100 calories, or simple multiples or fractions of these portions vary little from those ordinarily eaten, so that in some hospitals diets are regularly dispensed according to this plan. For several years I have used a graphic method for teaching purposes,

† The following figures simplified from Koenig and Rubner, etc., are approximately correct: At birth, 120 calories per kilogram; one to two years, 100 calories; two to four years, 80 calories; six to eight years, 60 calories; sixteen to eighteen years, 40 calories; adults at rest, 30 calories; at light work, 40 calories; at heavy work, 50 calories; at laborious work, 60 or more calories.



which is based on that of Fisher's, just described. Portions of various foods, so adjusted as to produce 100 calories, or, in certain cases, 25, 50 or 75 calories, have been preserved in 8 or 12-ounce nursing bottles or in jars of graduated capacity, accord-

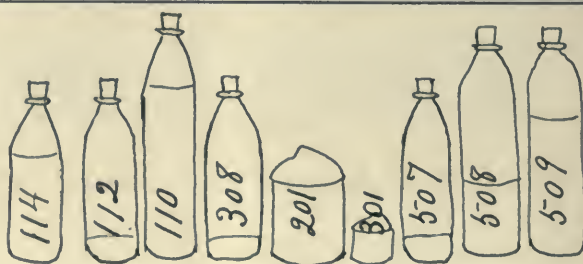


ILLUSTRATION 4.

ing to their physical form. This plan permits one at once to estimate the approximate quantity of each substance shown, by the graduation on the bottles or by the relative size of the containing jars. These specimens have been so satisfactory in teaching dietetic principles or illustrating the diet of special diseases that I have recently added to their number, with the aim of forming what Dr. Riesman has aptly styled "a dietetic museum." The present exhibit consists of about fifty bottles and thirty jars, illustrating (1) the different forms and dilutions of milk used in

infant feeding, as well as a few of the commoner diluents and milk substitutes, and (2) articles of diet used in early childhood, including meats, fish, eggs, vegetables, breads, cereals, fruits and nuts, sweets and dairy products. A tabulated list of the articles follows. In the first part, or left side, of the tables the weight of the substance described which is required to produce 100 calories is given in grams and in ounces, avoirdupois. In the second part, or right side, "the calories per cent." are given. These were adapted from Fisher or newly calculated. In estimating calories, fractions have been omitted. The figures in parenthesis

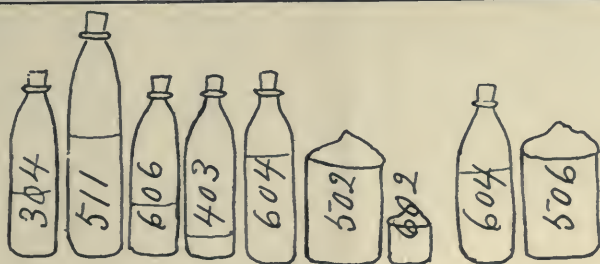


ILLUSTRATION 5.

represent grams of protein, fat or carbohydrate. Decimals beyond the first place have been disregarded.

In the case of liquids, the bulk in fluid ounces, as shown on the bottles, has been added to the tables. The liquids should be

weighed in each instance, except in the case of milk mixtures, where the usual percentage analyses are based on the number of grams of protein, fat and carbohydrate in 100 c.c. by bulk, instead of in 100 grams by weight. The equivalents in fluid ounces are, of course, only approximate.

## 1.

Cal.	Article.	Wt.	P.	F.	C.H.	Ref. No.
100	Steak Tenderloin†...	35 gr. (1.3)	34 (8.2)	66 (7.1)	00	101
100	Beef scraped.§ (Round cooked lean)	54 (2)	61 (15)	39 (4.2)	00	102
100	Panopepton.¶ Largest dose recommended, 15 cc.....	140 cc. 5 oz.	40	0	60	103
100	Chicken, Roast†....	55 (2)	73 (17.8)	23 (2.4)	4 (1)	104
100	Halibut† .....	83 (3)	70 (17)	30 (3.3)	00 (00)	105
50	Oysters (raw on shell) .....	96 (3.4)	25 (6)	11 (1.2)	14 (3.1)	106
100	Bacon (raw).....	15 (.5)	6 (1.5)	94 (10.1)	00	107
25	Consomme .....	207 (7.3)	21 (5)	00	4 (1)	108
25	Beef juice.....	150				
	Warm process†... 5.3 oz.					109
12.5	Beef broth†.....	312				
	P. 1.02.....	11.1 oz.				
25	Beef juice.....	200				110
	Cold process†.....	7.1 oz.				
	P. 3.00.....	7 fl. oz.				111
100	Yolks (a).....	27 (1)				
		¾ fl. oz.	17 (4.1)	83 (8.9)	00 (0)	112
75	Bolled egg (small) (b) .....	45 (1.6)	24 (5.8)	51 (5.4)	00	113
100	Egg white (c) from 7 eggs, 26 gm. each	181 (6.4)				
		6¼ fl. oz.	100 (24)	00	00	114
25	Albumen water,† double strength.....	200				115
	2 white to 8 oz....	7.1 oz.				
	(52 g. egg white)...	7 fl. oz.				
	(a) ½ bulk, 6-7 caloric value.					
	(b) Shell, 11 per cent. gross wt.		If net wt., 59, yields 100 cal.			
	(c) ½ bulk, 1-7 caloric value.					

## 2.

Cal.	Article.	Wt.	P.	F.	C.H.	Ref. No.
25	Asparagus (canned).	135 (4.9)	8 (1.9)	1 (0.1)	16 (3.9)	201
50	Green peas (canned)	89 (3.1)	12 (2.9)	2 (0.2)	36 (8.8)	202
25	Lettuce .....	126 (4.5)	6 (1.5)	3 (0.3)	16 (3.9)	203
100	Lima beans† (cooked).	62 (2.2)	21 (4.9)	4 (0.4)	75 (18)	204
100	Potato (baked).....	86 (3.0)	11 (2.6)	1 (0.1)	88 (2.2)	205
50	Spinach (cooked)...	87 (3.0)	7 (1.8)	33 (3.5)	10 (2.5)	206
25	Tomatoes (canned)..	108 (3.8)	5 (1.2)	2 (0.2)	18 (4.5)	207
		3½ fl. oz.				
100	Baked beans† (home-made) .....	50 (1.8)	15 (3.6)	40 (4.2)	45 (11.6)	208
100	Pea soup† (split)...	77 (2.8)				209
		2¾ fl. oz.				

## 3.

Cal.	Article.	Wt.	P.	F.	C.H.	Ref. No.
100	Flgs .....	31 (1.1)	5 (1.2)	0	95 (23.2)	301
50	Apples (raw).....	103 (3.6)	1 (0.2)	3 (0.3)	46 (11.2)	302
100	Bananas .....	100 (3.5)	5 (1.2)	5 (0.5)	90 (22)	303
50	Orange juice.....	94 (3.3)	0	0	50 (12)	304
		3½ fl. oz.				
100	Olives (green).....	32 (1.1)	1 (0.2)	84 (9)	15 (3.6)	305
100	Almonds .....	15 (0.5)	13 (3.1)	77 (8.3)	10 (2.5)	306
100	Peanuts .....	18 (0.6)	20 (4.7)	63 (6.7)	17 (4.1)	307
100	Olive oil.....	11 (0.4)	00	100 (10.7)	00	308
		½ fl. oz.				

## 4.

Cal.	Article.	Wt.	P.	F.	C.H.	Ref. No.
100	Sponge cake.....	25 (0.9)	7 (1.8)	25 (2.7)	68 (16.5)	401
100	Baked custard, † egg, milk, sugar 2, 2 tbsps., ¼ cup.....	73 (2.6)	17 (4)	37 (4)	46 (11.2)	402
100	Sugar, granulated or lump .....	24 (0.86)	0	0	100 (24)	403
100	Maple syrup.....	35 (1.2)	0	0	100 (24)	404
		1¼ fl. oz.				
100	Milk sugar, 2 even tablespoonfuls ...	25 (0.9)	0	0	100 (24)	405

## 5.

Cal.	Article.	Wt.	P.	F.	C.H.	Ref. No.
100	Homemade white bread .....	38 (1.3)	12 (2.9)	16 (1.7)	72 (17.6)	501
100	Rolls, French or Vienna .....	35 (1.2)	12 (2.9)	7 (0.7)	81 (19.7)	502
100	Shredded wheat....	27 (0.9)	13 (3.1)	5 (0.6)	82 (20)	503
100	Zwiebach .....	23 (0.8)	9 (2.2)	21 (2.3)	70 (17)	504
100	Graham crackers (3)	23 (0.8)	9 (2.2)	20 (2.2)	71 (17.4)	505
100	Soda biscuits (4)† (Uneeda) .....	24 (0.9)	9 (2.2)	20 (2.2)	71 (17.4)	506
100	Rice (raw).....	28 (1.0)	9 (2.2)	1 (0.1)	90 (22)	507
100	Rice (boiled) (5 fl. oz.) .....					508
100	Rice (flaked) (9 fl. oz. by bulk) .....					509
100	Cream of wheat (wheat flour)....	27 (1.0)	12 (2.9)	3 (0.3)	85 (21.0)	510
100	Cream of wheat (prepared) (6 fl. oz. by bulk) .....					511
100	Oatmeal (flaked)....	25 (0.9)	16 (3.9)	17 (1.8)	67 (16.9)	512
100	Oatmeal (prepared) .....					513
25	Barley water†.....	337				
	Tablespoonful to pint	12 oz.				
		11 fl. oz.				
100	Wheat or barley flour	27 (1.0)	12	3	85	514
						515

## 6.

Cal.	Article.	Wt.	P.	F.	C.H.	Ref. No.
100	Cheese, American...	22 (0.8)	25 (6)	73 (7.8)	2 (0.4)	601
100	Butter .....	13 (0.5)	1 (0.2)	99 (10.6)	00	602
100	Woman's milk, † 1.50; 4; 7.....	140 c.c.	8 (2.1)	52 (5.6)	40 (9.8)	603
		5 oz. Av.				
		5 fl. oz.				
100	Cow's milk† (average) .....	140 c.c.	20 (4.9)	52 (5.6)	28 (6.3)	604
	3.50; 4; 4.50.....	5 oz.				
		5 fl. oz.				
100	Cow's milk (rich)†. 3.50; 5; 4.50.....	127 c.c.				605
		4.5 oz.				
		4½ fl. oz.				
100	Cream, 16 per cent.† 3.25; 16; 4.05.....	56g.	7 (1.8)	84 (9)	9 (2.3)	606
		2 oz.				
		2 fl. oz.				
100	Cream, 20 per cent.† 3.05; 20; 3.90.....	47 c.c.				607
		1.7 oz.				
		1¾ fl. oz.				
100	Cream, 40 per cent.† 2.20; 40; 3.00.....	25 c.c.				608
		0.9 oz.				
		1 fl. oz.				
100	Top milk, 7 per cent.† 3.50; 7; 4.50.....	102g.				609
		3.6 oz.				
		3¾ fl. oz.				
100	Skimmed milk† (1.80 per cent.).....	200g.				610
	(6 oz. removed from a qt. of 4 per cent.) 3.60; 1.80; 4.50 .....	7.1 oz.				
		7 fl. oz.				



## MODIFICATIONS, ETC.

## 6. (Cont.)

Cal.	Article.	Wt.	P.	F.	C.H.	Ref. No.
100	From 10 per cent. milk, with addition milk sugar.†	256 c.c. 9.1 oz. 8½ fl. oz.				611
100	From 7 per cent. milk, with addition sugar,†	181g. 6.5 oz. 6 1-3 fl. oz.				612
100	From 4 per cent. milk, with addition sugar,†	169 6 oz. 6 fl. oz.				613
100	From skimmed milk (1.80) with su- gar,†	256g. 9.1 oz. 8½ fl. oz.				614
100	Condensed milk,†... (Eagle brand)..... 8.43; 6.94; 50.69...	33g. 1.2 oz. 1 fl. oz.				615
100	1 with 6 water..... 1.20; 0.99; 7.23.....	231 (8.3) 7½ fl. oz.				616
100	1 with 9 of water... 0.84; 0.69; 5.1.....	322 11.5 oz. 10¼ fl. oz.				617
100	Kumys from cow's milk† .....	220 8 oz. 7 1-3 fl. oz.				618
100	Buttermilk,† .....	278 9.9 oz. 9 fl. oz.				619
100	Whey (from whole milk)† .....	285 10 oz. 9 1-3 fl. oz.				620

\* Authorities, if not specified, Fisher, *American Journal of Physiology*, April 1, 1906; *Journal American Medical Association*, April 20, 1907.

† Holt, *Diseases Infancy and Childhood*. 5th Ed. Percentages arranged thus: P., F., C-H.

‡ Locke, *Food Values*, N. Y., 1911.

§ Atwater & Bryant, Bull. 28, Dept. Agriculture. (Also indirectly for analyses given by Fisher and Locke.)

|| New and non-official remedies.

The illustrations, with accompanying explanations, show clearly enough the manner of preparing and the method of employing a "dietetic museum" for purpose of demonstration either to students or physicians.

Illustration I. In this chart Fisher's method is graphically illustrated. In the center the amount of the substance named, sufficient to produce 100 calories, is indicated. To the left the colored space shows the percentage of 100 calories produced by each constituent. Thus in the case of the white of egg the space is red throughout, as all the calories are obtained from protein;

in the case of olive oil the uniform yellow color shows that all the calories are produced by fat. Similarly, in the case of sugar, the blue color indicates that all the calories are obtained from carbohydrate. In the case of the other foods the calories are produced largely by one material, but partly by another. Thus, in halibut, the major portion of calories are obtained from protein, in almonds from fat and in bread from carbohydrate. In the column to the right the actual amounts of protein, fat and

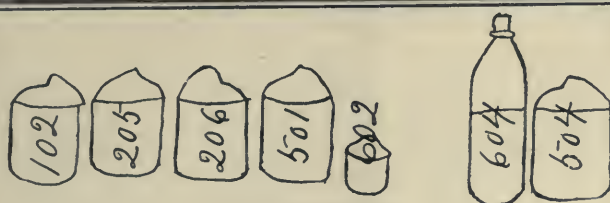
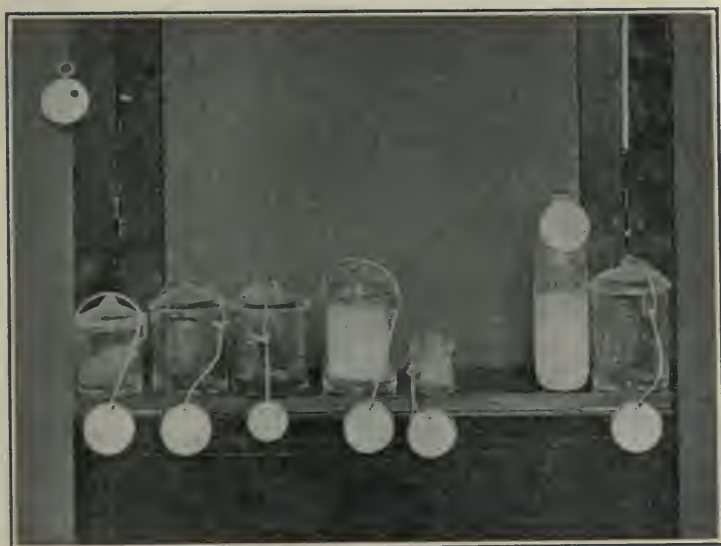


ILLUSTRATION 6.

carbohydrate are indicated graphically in a similar manner. If the figures there given are multiplied by the factors 4.1, 9.3, and 4.1, respectively, the calories charted on the left will be obtained.

Illustration II. This represents the obverse and reverse sides of the tags employed. On one side the number of the calories is stated, the name of the food and its weight in grams and ounces. On the reverse is a diagram illustrating the relative percentage of calories produced by protein, fat and carbohydrate, as

indicated by the red, yellow or blue color of the corresponding sectors. On each sector the number of grams of protein, fat or carbohydrate is written. The large tags represent 100 calories, the medium-sized ones, 50 calories, and the small tags, 25, or less, calories.

Illustration III. shows the complete series of jars and bottles listed in the tables. On the upper shelf are the jars arranged in

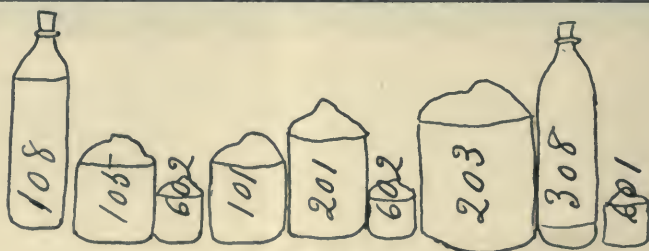


ILLUSTRATION 7.

rows to illustrate the different sizes employed. On the middle and lower shelf are the 8 and 12-ounce bottles containing various liquids and powders as described. In the front row have been placed a few of the more striking ones. Thus, on the second row we have olive oil, yolk of egg, sugar, condensed milk, milk sugar, pea soup, white of egg, albumen water, orange juice, beef juice and beef broth. In the front row of the lower shelf various concentrations of milk and cream are shown. Thus,

from left to right we have 40 per cent. cream, 20 per cent. cream, 16 per cent. cream, 7 per cent. top milk, 5 per cent. milk, 4 per cent. milk, human milk, skimmed milk, kumyss, buttermilk and whey. The attached key gives the reference numbers to the tables where the figures found on the labels may be consulted. Similar keys are given for the succeeding illustrations.

Illustration IV. shows a few striking comparisons. From left to right we have white of egg and yolk of egg in equivalent amounts; beef broth and olive oil, representing 12½ and 100 calories, respectively; asparagus and figs, corresponding to 25 and 100 calories, and rice raw, boiled and puffed, 100 calories being represented in each instance.

Illustrations V. and VI. show a diet suitable for a young child. In V. we have a breakfast consisting of orange juice, cream of wheat, cream, sugar, milk, roll and butter, also a luncheon, consisting of milk and crackers. In VI. a dinner, consisting of scraped beef, baked potato, spinach, bread and butter, and a supper, consisting of milk and zwiebach. The orange juice (as shown by the small tag) represents 50 calories, the others 100 calories, so that by simply counting the units the value of the day's ration is found to equal 1,550 calories. The following table shows how this diet may be modified, by taking a simple fractional part of certain units, to suit a child of four years, for example. The amount of fat, protein and carbohydrate in grams is also shown as obtained by adding the figures given on the labels:—

Units 100 Calories.	Article.	P.	F.	C.-H.	Cal.	Ref. No.
<i>First Meal:—</i>						
¼	Orange juice	0.0	0.0	6.0	25	304
½	Cream of wheat	1.5	0.15	10.5	50	510
½	Cream, 16%	0.9	4.5	1.1	50	606
¼	Sugar, 1 even tsp.	0.0	0.0	6.0	25	403
1	Milk, 4% (5 oz.)	4.9	5.6	6.3	100	604
½	Roll	1.5	0.4	9.8	50	502
½	Butter	0.1	5.3	0.0	50	350 602
<i>Second Meal:—</i>						
1	Milk	4.9	5.6	6.3	100	604
1	Crackers					
	(4 Unedas)	2.2	2.2	17.4	100 200	506



*Third Meal:—*

1	Scraped beef, 2 oz.	15.0	4.2	0.0	100	102
½	Potato (baked)	1.3	0.05	11.0	50	205
⅛	Spinach	0.4	0.9	0.6	12.5	206
½	Bread,					
	1 small slice	1.5	0.8	8.8	50	501
½	Butter, ½ ball	0.1	5.3	0.0	50	602
½	Custard	2.0	2.0	5.6	50 312.5	402

*Fourth Meal:—*

1	Milk	4.9	5.6	6.3	100	604
½	Zwiebach	1.1	1.1	8.5	50 150	504

Total	.....	42.3	43.7	104.2		1,012.5 cal.
		gms.	gms.	gms.		

Illustration VII. This represents one meal in a strict diabetic diet: Consomme, halibut, butter, steak (three portions), asparagus, butter, lettuce (half amount shown), olive oil and cheese constitute the meal (862.5 calories). This is for an adult, and is introduced to show the adaptation of the method to the demonstration of special dietaries.

*117 South Twenty-second Street, Philadelphia.*

EPIDEMIC SUMMER DIARRHEA.—H. K. Waller and G. Walker (*British Medical Journal*, September 16, 1911) detail the treatment of this condition as carried out at the East London Hospital as follows: On admission the stomach and rectum are washed out with warm saline. For shock or collapse a mustard bath or pack is used. The child is then given a subcutaneous infusion of normal saline, or of a 5 per cent. solution of glucose in normal saline. The amount usually ordered is 7 ounces, and this takes two hours to run in. The method of feeding is of the greatest difficulty. Water, preferably hot, is all that is allowed for twenty-four hours. The subcutaneous infusion is frequently repeated. Whey is valuable as the first food. Still better is a mixture of glucose and lact-albumin. Milk, freely diluted with water and with the addition of sodium citrate, is tried only when the diarrhea has shown signs of subsiding. Of drugs, calomel, castor oil, and opium seem the best.—*Medical Record.*

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## A RAPID AND SIMPLE METHOD FOR CALCULATING THE CALORIC VALUE OF PERCENTAGE MIXTURES.\*

BY FREDERICK FRALEY, M.D.,

Philadelphia.

The results obtained from either percentage or caloric methods of feeding depend entirely upon their intelligent application.

Whatever may be one's personal opinion as to their merits as systems of feeding, it may at least be said that they furnish valuable means of keeping a check upon the ingredients and full content of our mixtures.

No one who is treating a very sick baby bothers himself about the percentages in the food he orders, or the number of calories it contains, but strives to meet each emergency as his best judgment dictates.

Under other circumstances, however, it is very helpful to have a percentage standard to use in instituting a diet, and in definitely modifying it for the needs of the baby as occasion requires.

Similarly, the caloric estimation of the food is valuable, in that it furnishes an additional safeguard against under or over-feeding in energy production.

When we order a mixture of a certain formula, we do not expect that the percentages will be *exactly* as prescribed, and so, also, we cannot be absolutely accurate in our estimation of the caloric value of our mixtures. But as we are not dealing with mere machinery, but with organs possessing a wide range of adaptability for foods, it is quite sufficient that our formulæ be *approximately* accurate, and the margin of error, which would be inexcusable if we were engineers or chemists, is reasonably negligible for us as physiologists.

Assuming that one is familiar with percentage determination, and the approximate caloric requirements of infants in regard to weight and age, the method I have devised will, I think, prove simple, and certainly more rapid, than the present method of adding together the caloric values of each ingredient in a mixture.

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\* Read before the Philadelphia Pediatric Society, December 12, 1911. For discussion, see page 149.

It has been repeatedly determined, by accurate experimentation, that upon complete combustion,

1 gram of fat yields 9.3 calories.

1 gram of protein yields 4.1 calories.

1 gram of carbohydrate yields 4.1 calories.

Now 1 fluid ounce (apothecaries measure) contains 28.41 c.c.; 28.41 c.c. equals 28.41 gm. weight in distilled water at 4°C. But milk with an average specific gravity of 1.030 would give a weight of 29.25 gm. per c.c., and as the estimation concerns itself with the solid constituents of milk, we should use the latter figures in making our calculations. One ounce of fat (fluid measure) would therefore equal  $9.3 \times 29.25$ , or 272.025 calories, and each 1 per cent. fat in an ounce 2.7 calories. One ounce of protein or of carbohydrate would equal  $4.1 \times 29.25$ , or 119.725 calories, and each 1 per cent. of these substances 1.2 calories.

Using F to designate fat percentage, P for protein, S for carbohydrate (in order not to confuse it with C for calories), and Q for the quantity expressed in *ounce*, we obtain the general formula,

$$2.7 F + 1.2 P + 1.2 S \times Q = C.$$

Dividing the *first* term, and multiplying the *last* term by 1.2 does not change the result, and yields the following simpler equation, which expressed in fractions reads,

$$2\frac{1}{4} F + P + S \times 1\frac{2}{10} Q = C.$$

If we substitute the usually accepted percentage formula of cow's milk, F 4 per cent., P 3.5 per cent., S 4.5 per cent. in the above equation, we obtain the following value:—

$$9 + 3.5 + 4.5 \times 1.2 = 20.4 \text{ calories per ounce.}$$

If we prefer we may employ Baner's convenient figures of 4 per cent. each, F, P and S, which adds to the protein that which it subtracts from the carbohydrate, but as these are equal in caloric value leaves the final result unchanged—

$$9 + 4 + 4 \times 1.2 = 20.4 \text{ calories per ounce.}$$

For convenience milk is usually given a value of 20 calories per ounce, and the above formula is rather cumbersome for use on account of the fractions it contains.

I found that by assuming an arbitrary formula, which slightly lowered the caloric value of the fat, and slightly raised that of

the protein and carbohydrate, I could obtain a simple formula which would give a value of exactly 20 calories per ounce of milk, and 50 calories per ounce 16 per cent. cream, or, in other words, a correct *total caloric value*, which is, after all, that which is desired.

If, instead of  $2\frac{1}{4} F + P + S \times 1\frac{2}{10} Q = C$ , we employ  $2 F + P + S \times 1\frac{1}{4} Q = C$ , we have instead of  $9 + 3.5 + 4.5 \times 1.2 = 20.4$  calories,

$$8 + 3\frac{1}{2} + 4\frac{1}{2} \times 1\frac{1}{4} = 20 \text{ calories.}$$

In other words, we have reduced the value of the fat from 10.8 calories to 10 calories per ounce, and increased the *combined* value of the protein and the carbohydrate from 9.6 calories to 10 calories per ounce.

Now Holt, in the September number of the ARCHIVES, estimates that each 1 per cent. fat in an ounce of milk equals 2.5 calories, and it can be seen that my estimation of 10 calories for an ounce of 4 per cent. fat also yields a value of 2.5 calories for each 1 per cent. of fat.

My arbitrary formula— $2 F + P + S \times 1\frac{1}{4} Q = C$ —though not *mathematically* correct in construction, gives a correct result in practical application, and has been used by others beside myself with satisfactory results.

Personally, I find it rapid, simple and convenient, and holding good for any percentage milk mixture.

For example, suppose a mixture

16 per cent. cream .....	2 oz.
Milk .....	14 "
Lactose .....	1 "
Diluent qs. ad .....	32 "

Its formula is  $F 2.75, P 2, S 5.1$ , according to Baner's method.

2 oz. cream	=	100	calories
14 " milk	=	280	"
1 " lactose	=	125	"

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Total..... 505 calories

$2 F + P + S = 5.5 + 2 + 5.1$  or  $12.6 \times 40 (1\frac{1}{4} \times 32) = 504$  calories.

314 South Seventeenth Street.



## A PROGRAMME FOR SEX INSTRUCTION.\*

BY IRA S. WILE, M.S., M.D.,

New York City.

"The concealment of truth is the only indecorum known to science," wrote Westermarck. In no part of human affairs is this more true than in the veil of mystery that is thrown around the problems of sex and its correlated phenomena.

While it is generally correct that every cause is an effect and every effect is a cause, careful thought will show that the sex problems arise from two fundamental causes. In the last analysis the main problems that are of interest to a conference on charities and corrections arise from a clash of temptation and wills. Society presents one cause, the temptation, through the real social evils of overwork and underpay and delayed marriages, poor-housing facilities with the consequent trials of room-congestion and lack of personal privacy, child labor and the intermingling of children and adults under unnatural conditions and at dangerous times, inadequate opportunity for the expression of the energy of the human species and the train of horrors like dance halls, saloons, boat excursions, family unhappiness and the desire to be somebody and have something that is beyond the daily measure of earnings. All these are but a small part of the ills that can be remedied only through the interaction of the aggregate of individuals that is termed society. This forms the soil from which the sexual weed emanates.

The seed lies within the individual and the fertility of the weed depends upon the essential nature of the seed as gotten from its parents and the character of the soil upon which it is to fall. The will of the individual is the second important factor that demands consideration. The development of the will of the child is largely in the power of the parents. Children are largely what their parents make them, though their character is constantly undergoing changes due to the reaction to environment. This factor of character development may be guided through adequate education for which the parents should be held responsible. The truths pertaining to sex must not be concealed any longer.

It is not my purpose to consider the origin of external temptation save to remark that the White Slave Traffic, prostitution and

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\*Read before the twelfth New York State Conference on Charities and Corrections, Watertown, N. Y., October 18, 1911.

similar crimes against the person have their strongest roots in the poverty of the majority of the community as measured by the standard of living that has been established by this conference and in the inequalities of our present industrial system and does not originate in an inherent viciousness of those who fall as victims in the strife.

Society reaps the whirlwind in venereal disease, unnecessary blindness, insanity, marital infelicity, divorces, desertions, invalidism of soldiers and sailors, the preventable mutilation of women and men. In truth society pays for its shortcomings, just as the body of the individual suffers from malnutrition, alcoholism and sexual abuses.

An opportunity for the removal of at least a large portion of the burden borne by society lies in a wholesale education of the community as to the relation of the social life and the social evils, so-called. Organizations for the betterment of the masses, churches, schools, labor unions, women's clubs, Y. M. C. As., medical societies must unite in a widespread campaign for public enlightenment upon the problems that are generally termed the sex-problems. The good example set by the various societies for sanitary and moral prophylaxis in stimulating public opinion must be followed. Not the least of this work of education must be in the hands of the physicians who at present are in possession of the most information upon the subject, at least in its physical aspects. The responsibility for the present general ignorance about the entire sex problem in its widest application to the affairs of the world must be placed upon society as a whole that has been countenancing a double standard of morality and refusing to listen to the words of those who have sought to show its error.

In the evolution of the character of a child two large influences are involved: that of the home and that of the companionships of childhood. In the accumulation of information regarding sex, the home as a factor has unfortunately been almost negligible. Parental timidity, or shall I say cowardice, has made it difficult for parents to impart the information regarding reproduction or even the differences of sexes to their children. An unintelligent false modesty has placed the taboo on all references to the development of the emotional and physical side of sex as it seeks for expression at various times in the period of life from infancy to adolescence. The average child of to-day secures the garbled, befuddled, vulgar ideas that he prizes so highly but

dares not even dream of in the vicinity of his parents from his associates at school, or on the streets, or from the atrocious booklets, issued by some charlatan, that have been placed into his hands for the purpose of creating those false impressions that the child hesitates to talk over with his parents. The home of to-day is largely responsible for the weaknesses of instruction with reference to the development of the physiology of sex and the relation of the individual to the generations unborn.

Parents must come to realize that sex is at the basis of a proper appreciation of many phases of life. The idea of creation as a religious concept is essentially a sex-problem. Biblical literature abounds in allusions to sexual questions that can be appreciated only by the best informed readers. Mythology cannot be read nor understood by the uninformed. Chivalry demands sex knowledge for its comprehension. Literature from the Canterbury Tales to Balzac, Tolstoy, Ibsen, Sudermann, or the novelists whose names are not to be handed down to posterity but whose works are for the multitude of to-day, centers about the relations of the sexes. Plautus, Terence, Sophocles, Shakespeare, the modern dramatists make the most of that phase of life that is so frequently termed the human interest. From the Nibelung's Ring to Pelleas and Melisande, an initiation into the laws of sex is essential in order to intelligently interpret the operas. Art, painting and sculpture, supplies numerous themes that have arisen from the depths of sex experience. All this parents know and still they close their eyes and refuse to see the light or to illumine the path for their children. Parents have a tremendous responsibility to their children and no less a responsibility to society. Parental protection is lost in this field of education, where the relation between parent and child should be the closest.

When should parental instruction begin? When the child first expresses a desire to know as evidenced by a question. At three years, or four or five, whatever the age may be that finds the youngster seeking information from the parent from whom all other knowledge has been gotten for the asking. Whence comes the baby? What a natural query. The usual answer is most unnatural, for the parent fails usually to tell the truth if any attempt is made to reply in terms other than to tell the child to run away as mother is very busy. The child sooner or later takes the unanswered question to some one who will answer it even though the informant is only a playmate who knows little



more about the matter. The first break in the confidence that should exist is thus easily made. At times an evasive or false answer drives the child to seek more light and then the parent is driven back to another falsehood until finally the child's mind grasps the inconsistencies of the replies given upon various occasions or realizes that the parent does not desire to discuss such questions any more. The sense of secrecy arises and then the child feels ashamed of the subject and cannot bring itself to talk frankly with the parent. The opportunity of the child's life has been lost. Henceforth the child must be left to its own devices to ascertain the facts that it wishes to learn, from the playmates, from the gang mates, from pornographic writings, from the charlatan's fear instilling booklet, from misinterpreted dictionary definitions, from posters, lying advertisements, from vicious associates, from cruel traditions and unholy advice, from reading forbidden books and seeing forbidden plays.

Too frequently one hears of the advisability of teaching sex hygiene at puberty. This is too late to begin. The average child of the city has the major part of his sex information, or rather misinformation, long before puberty. To wait for this time is to make the instruction more difficult because the parent who has never spoken to his child regarding the origin of life before puberty scarcely ever can summon up sufficient courage to broach the subject at this time, when the child has also had created the barrier of shame. In addition, the problem is more difficult, because it is necessary to clear the child's mind of the erroneous ideas before it is possible to establish the weighty truths that are to be imparted. Innocence and ignorance are not the same. The so-called innocent child of twelve years of age is well versed in sex-lore. The training in sex hygiene must be begun at the earliest possible age. The crux of the problem lies not in the few lectures that are at times suggested for the high schools and the colleges. Character is too far developed at this age and habits for good or for bad are well established; in fact, irretrievable harm may already have befallen the child. The education must be started at the earliest opportunity.

The public school has long been urged as the proper place at which to have the instruction imparted. As far as the elementary school is concerned, I believe this is an error, as the subject can be better handled by the individual parents for the individual children. The average teacher of to-day is not fitted to teach the subject. The age variations in a single grade, the variations in mentality, the differences in sex precocity, not to mention sex



experience make the teaching of sex hygiene a very difficult problem for the school, even though the instruction is given to the children of each sex separately by a teacher of the same sex. The function of the school is to give children such instruction as cannot be imparted at the home, but instruction in sex hygiene is naturally a part of home training although it represents a largely untried field of parental endeavor.

The school may be of assistance in instructing parents how to give the teachings to their children or in special cases at the request of the parents a teacher might take up the question involved with individual children. As class instruction it seems to me undesirable at present. The school by giving adequate teaching in general hygiene and by affording an opportunity for acquiring some fundamental training in biology will be doing its share in making possible intelligent training as to the laws of sex as they must be interpreted at puberty and thereafter. The entire teaching must be characterized by frankness and honesty. The amount of time now given to the question of alcohol would be spent to far greater advantage were part of it given to the demonstration of the development of plants and animals in accordance with the biological principles involved. Only with trained teachers and adequate text-books will this become possible, and then probably only in the highest grade or in the secondary schools.

And so I am harking back to the home and to the parents. Honesty and frankness, courage and conviction, and the goal of instruction is attainable. The purpose of such teaching in the home is to establish an intellectual morality, not founded upon fear but upon a correct conception as to the relations of the sexes and the necessity of personal purity for the advancement of the human race.

Many will promptly say knowledge will not bring about all this. Possibly not but it is worth a trial. At least parents will be in a position to say that they have at least attempted to help their children develop along the proper lines that make for sex purity. If along with the training in the homes the social causes that go to make the great temptation are gradually obliterated, I am optimist enough to believe that the physical, mental, and moral havoc that now besets us on all sides will be very largely eliminated. Ignorance of the sex responsibilities and the dangers to the community that have resulted must be eradicated.

As a result of an experience covering several years in the actual work of giving instruction in sex problems to classes of

the so-called tenement-house mothers of various nationalities, to mothers and fathers of children in the schools of New York, to social workers, to classes of boys in groups varying in age from nine to twenty-one, to school teachers, my plan for instruction has been evolved along practical lines.

For the purpose of convenience I have set three age periods for which different types of sex instruction must be given in order to secure the best results. First comes the age of mythology; second the age of chivalry; third, the age of civic awakening. Beginning with the child at its earliest age, a plan of sex education may be followed that will result in the maintenance of the confidences of the child and the inculcation of the sex ideals that can be best established through rational sex instruction continuing over the entire life of the child.

The age of mythology constitutes that period of child life that is particularly keen in imagination. It represents the period when the witch and the fairy, Hansel and Gretel, or the giant and the dwarf, the goblins and the elves make the little eyes grow big with astonishment and wonder. Raggylug and all the animal creations are living in the child's domain. The child world is peopled with strange creatures that are most real. Mentally the fairy tale, the romance, the animal story, and Nature wonders supply the best intellectual pabulum. It is the wonder age and question follows question in the pursuit of information. At this time the child is first asking the parent for light as to the differences between boys and girls, where does the baby come from and at the same time is prattling about the mother cat and the baby cats or the kittens. The main factor necessary for sex instruction at this age is the determination of the parent to answer honestly every question that is asked by the child for at this age the child has all to learn. Giving vague or evasive answers only puts off the hour of combat. A correct start having been made there will never again be any hesitation or embarrassment on the part of the parent—the child will not feel confused or embarrassed unless the parent creates such a state of mind through a discipline that makes the child self-conscious. The second necessity is the possession of some fundamental facts that may be interpreted to the child through the medium of story or imaginative tale. The child easily learns the relation between baby and mother. The mother dog and the father dog, the cow and the calf, the horse and the mare and the foal, the lion, the lioness and the cub, the relation of the father, mother and baby soon come to be distinct concepts of the child. The second idea that is

readily absorbed is the egg, and the chick that comes therefrom, and the mother hen that laid the egg. The dependence of life upon the egg seems a large problem for the child to solve, but the youngsters grasp it easily. The third step to be taken is to show the sex organization of plants. The planting of a little oats or grass seed will serve for the lesson. The little green shoots are called the baby oats and the idea of the baby plant coming from a seed is implanted upon the fertile child mind. It is but a short step to show the child the mother plant whence came the seed. The identity of the seed and the egg as the source of life, once appreciated there is a well established foundation for teaching the origin of human life. To go a step further, one can teach the child about the boys and girls that live together within the walls made of petals. The masculine nature of the stamens and the essential femininity of the pistils can be easily explained in terms of plays and games that the child knows. The modes of transference of the pollen and the fertilization of the seed that may be shown always to be in the female part of the flower lays an excellent foundation for the expansion of the sexual themes through the years to come. It must not be imagined that this brief suggestion is to be the work of a day. It must not be forced but should grow day by day and merely for the purpose of enlightening the child without creating any morbid feelings or a craving for unnatural knowledge.

Gradually the child outgrows the age of mythology and enters the age of chivalry. There is no sharp line of demarcation of the two periods nor can any age be given when the transition occurs. The age of chivalry is really a prepubertal period. The child's body is beginning to take on new growth, the sexual functions are beginning to expand, the emotional side is unfolding at a very rapid pace. It is the glorious age of self-appreciation and a time when the child has the largest impulses for getting out to help in the work of the world but can merely dream. The actual expression of the sexual development may be marked by the intensification of affection for the family. Mother, sister and brother are terms that take on a fuller meaning. It is the time that the boy thinks that he really is a man when his mother asks him to take her around the corner at seven o'clock in the evening as her protector. He is a sort of hero seeking worlds to conquer. The blood begins to surge through his head at the reference to one of his feminine schoolmates. The society of girls is desired and their company is sought and the party days are at hand with their dangerous period of amorous games. The



girls are blossoming out into rounded form and their thoughts too are expanding. This is the time of "the lady bountiful." The desire to become a trained nurse, to enter a nunnery, to found an institution for the salvation of unregenerate felines or to be possessed of untold wealth for the betterment of mankind fills the day with joy. It is the age of the romantic walk and the day of looking with rapturous glances at the handsome features of the matinee idol, whose face graces the chiffoniers. It is the time when competition in the battle for favors manifests itself and the parent is accused of not understanding the child's feelings or even life. It is the day of the most dangerous gang life for boys and girls. The desire for independence, the recognition of sex class feeling, the old reticence on the part of parents to talk on the problems of puberty makes the source of information outside of the home. By a system of graduated instruction this period of chivalry has no terrors for the parent. Conversation is frank and confidence is retained and the child is protected from the most malicious influences that are surrounding it at this time of life. The emotional characteristics of the individual child are watched and guided through the mazes of conflicting sensations that attack the child at puberty. The knowledge of plants and animals that has been acquired through observation or by school teaching is all of use in explaining the natural functional phenomena that slowly transform the more or less sexless child into a creature that is sex conscious and views himself as the parents' equal. No attempt is to be made to develop a sexual and sensual child. The light that is shed upon the sex problems in the home banishes the foulness of mind that is engendered by the looseness and lack of intelligent handling of the questions at the present time. A strong appeal can be made upon the chivalric side of child nature. The child can well be made to understand pride in family and self-respect as factors that are to be considered in the daily conduct of one sex toward the opposite sex. The necessity of personal cleanliness, the healthfulness of exercise and outdoor sports must be accentuated. The pernicious influence of smutty stories, lascivious literature, immodest attire, vulgar dancing demand especial attention without laying any stress upon the subjects so as to give them undue prominence as factors in the child's life. Great caution is required so as to avoid the serious danger of arousing morbid desires or stimulating latent feelings that have not yet forced themselves upon consciousness.

The period of civic awakening in turn marks a further de-



velopment of character. The child in beginning adolescence appreciates that it is part of a community. The thoughts of future marriage already occupy a share of the mental horizon. The understanding of the relation of the individual to the community or the state is slowly coming to play a part in the individual's life. The desire to vote, to have a home of one's own, to take a place in the affairs of the world marks the arrival of the child to a plane of emotions that will enable a parent to make an appeal to the altruistic sentiments. The relation of personal purity to the welfare of the state, the dangers of venereal disease not to the erring youth but to the innocent community or individual as the future wife or children or friends makes a strong impression upon the adolescent. The information that has been given during the previous years of life are recapitulated and again interpreted in terms of duty to the state and responsibility to the community. It is a striking thought to an adolescent to realize that he has a responsibility for the health and welfare of the community and that his personal life has bound up in it the life and health and happiness of many other persons. The argument makes an appeal to the highest motives and the best thought of the adolescent and tends to serve as a keystone to the arched will that has been in course of development throughout the life of the individual.

This program of instruction is personal and established through personal parental instruction. Books are not of much value during the early years of life and often, if given to the children during the age of chivalry do considerable harm because they awaken thoughts for which the child is not prepared. Some of the books are distinctly morbid and tend to give children false impressions that are confusing in the light of their lack of experience with actual sex life. Books may even create a desire for personal experiences that are fraught with danger. Special books in the hands of parents are most valuable for purposes of adequate instruction.

Sex instruction should be undertaken by every conscientious parent. Knowledge is power for good or for evil. The use to which sex knowledge is to be put depends upon the development of the will of the child so that upon the basis of correct instruction as to sex physiology, psychology and purpose it may know evil and right and elect to live voluntarily and gladly a life that will be no menace to himself, his parents, his family or the community of which as a child he is such an essential part.

*230 West Ninety-seventh Street.*

## SOCIETY REPORTS.

### THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

*Stated Meeting, Held January 11, 1912.*

DR. WILLIAM SHANNON, CHAIRMAN.

#### A CASE OF TORSION OF UTERINE ADNEXA IN HERNIA IN INFANTS.

DR. ALEXIS V. MOSCHCOWITZ presented this patient. He said that it might be accident or the law of the duplicity of cases that had enabled him to observe and operate upon 2 cases within a period of five months. The history of the 2 cases was practically the same, though unfortunately he could present but 1 at this meeting. The baby was admitted to Mount Sinai Hospital on March 25, 1911, at the age of five months. She had been taken to Dr. Heiman for regulation of the diet on the previous day, and upon examination he had found her normal except for six toes on each foot. About nine hours before admission the child had cried considerably and the mother had noticed a swelling in the left groin. Dr. Heiman promptly sent the child to the hospital with the diagnosis of strangulated hernia. At the time of admission the vomiting had ceased and the bowels moved spontaneously and by enema; the pulse, temperature and respirations were normal. There was, however, a distinct swelling the size of a plum in the left groin. Dr. Moschcowitz saw the baby a short time afterward and confirmed the diagnosis, but made the more exact diagnosis that the hernia contained either the tube and ovary, or a portion of the uterus. At operation, the sac was seen to emerge from the external inguinal ring; but instead of taking the usual course into the labium, the sac was reflected upward and outward. Here was a perfect example of an inguino-superficial hernia. The left tube and ovary were found in the sac twisted in one complete revolution. The baby made an uneventful recovery, and is well at the end of nine months after the operation. Five months after this a baby was brought to his office and a diagnosis of strangulated ovarian hernia was made. The child was operated upon at Mount Sinai Hospital, but he could not say with absolute certainty that there was any twist

of the ovary in this case. A good recovery followed operation in this case.

#### CASES SHOWING THE BENEFIT DERIVED FROM TREATMENT IN BIRTH (ERB'S) PARALYSIS.

DR. HENRY W. FRAUENTHAL presented these 2 patients and showed photographs of others which demonstrated the results of but two or three weeks' treatment in patients, whose ages ranged from six months to twenty-two years. The first patient shown had Erb's paralysis with a very frail arm. After six months' treatment this patient had practically a normal range of motion; the part, however, had failed to get its normal growth. The condition of the arm was due to an injury to the nerves, which affected the bone growth and not merely to non-use. The second patient presented was a woman, twenty-two years of age, who had a claw hand. No attempt at treatment had ever been made. Now, however, after three months' treatment at the hospital, there was a marked improvement in the hand and arm. Cases of claw hand could be greatly benefited by education. The tone of the muscles in this case had been improved very much under the treatment described in his paper. He hoped to be able to show the patient a year later.

#### CASE OF CHRONIC COLITIS IN A CHILD THREE YEARS OF AGE, WITH DEFORMITY AND DEVIATION OF THE SIGMOID FLEXURE.

DR. J. FINLEY BELL presented this patient, who came under his care June 2, 1909, when about five months old and weighing six and one-quarter pounds.

#### TORSION OF UTERINE ADNEXA IN HERNIÆ OF NURSINGS.

DR. ALEXIS MOSCHOWITZ read this paper, in which he said that the cases just reported were 2 of 4 in which an approximately correct diagnosis had been made. A search of the literature on this subject showed that the condition was rare and that the total number of cases reported, including his own, was only 40. The clinical pictures in these cases revealed a remarkable uniformity. All cases of ovarian hernia in children with acute symptoms might be divided into three groups: (1) Those in which a torsion of the pedicle had been distinctly noted in the



history. (2) Those in which no torsion was present. (3) Those in which a torsion of the pedicle had not been noted. Many of the latter class were also cases of torsion of the pedicle, but either the torsion was not noted, or it became untwisted during manipulation of the more or less hurried operation necessitated by the tender age of the patients. Dr. Moschowitz discussed the subject from three viewpoints, namely, the presence of ovarian hernia in infants under one year of age, that of torsion of the ovary, and the diagnosis. The frequency of ovarian hernia in infants under one year of age and in child-bearing adults was a striking phenomenon. Ovarian hernia practically did not occur in older children and in virgins, except as neglected cases of hernia in infancy. During intrauterine life the ovary descended only as far as the brim of the pelvis, and remained there for a year or more; later, the weight of the ovary and the deepening of the pelvis caused it to descend. This explained why, in early infancy, the ovary was an extrapelvic organ, and was thus more liable to enter a hernial sac. The strongest predisposing cause for a hernia of the ovary was the fact that the sac was congenital. However, it was difficult to prove that the sac was congenital in the female. Observations seemed to indicate that congenital hernia was as frequent in the female as in the male. In many cases the nature of the sac was such that it could be accounted for in no other way except as being congenital. The writer based this statement on the fact that in a rather extensive experience he had found two varieties of sacs in oblique inguinal hernia. In the one the sac followed the course of the round ligament and was separable from it with great ease; in the other and more frequent form, the sac was very delicate and intimately adherent to the round ligament, so much so as to be practically inseparable from it. The former was an acquired and the latter a congenital hernia. Torsion of the ovary in the hernial sac was a question as much mooted as torsion of other organs. A disproportion between the size of the twisting body and its pedicle seemed to be a prerequisite for all torsions, and this disproportion was present to a perfect degree in the ovary. Schnitzler explained the torsion by the ingenious theory that as the ovary could not pass easily through the disproportionately narrow inguinal canal, when it did become engaged, is further propulsion could only be effected by a sort of corkscrew motion, which resulted in torsion. Payr explained the torsion in an equally in-



genious way by attributing it to stasis of the blood in the pedicle from some cause, as kinks, compression, etc., which did not permit the thin-walled veins to empty themselves as fast as thicker and less compressible arteries pumped the blood into the mass. As a result, the veins at first became lengthened, and when the lengthening was no longer compensatory, the veins twisted around the firmer parts of the pedicle, causing a beginning torsion. In making the diagnosis of twisted pedicle in ovarian herniæ in infants, the fact of the existence of a hernia, as well as the fact that it was strangulated, was obvious. The diagnosis of the organ contained in the sac could be reached by exclusion. The fact that the child was in excellent condition and was free from bowel trouble excluded the involvement of the gut at once. The omentum was excluded by the extreme rarity of omental hernia in infants. The chances of the sac containing the uterus, or the horn of a bicornuate uterus, were considered improbable, owing to the rarity of this condition and the immobility of this organ. Nothing remained, therefore, except the tube and ovary. Torsion of the ovary practically always occurred in strangulations of this organ in herniæ of infants. Of the 40 cases reported, diagnosis was made in 1 case only, and that by Quadflieg, who had had the advantage of having operated upon a similar case a short time previously. Of the cases reported, 19 occurred on the left and 20 on the right side. The clinical picture in every case was practically that described in the cases reported.

Heegard's first case was of unusual interest. The patient, a baby, four weeks old, was admitted to the hospital on account of a swelling in the left inguinal region, which had been diagnosed as an abscess. At operation, a twisted tube and ovary were found and extirpated. About five weeks later the child was readmitted to the hospital, the mother having again noticed a swelling in the left inguinal region, which increased on straining. An exploratory incision revealed the right ovary and tube, which had prolapsed through the left inguinal canal. In a case reported by Tubby both the right and the left adnexa were found in the hernia. In regard to treatment, gentle taxis might be tried if the case was of recent origin. If this course was not successful, prompt operation was indicated. A prompt operation might save the ovary by untwisting the torsion, while delay would mean the extirpation of the organ. In either event, the prognosis might be said to be good.

DR. JOHN DOUGLAS said he had had 2 cases of hernia of the tube and ovary—I in a child who was five months of age. The patient was admitted to the hospital with the diagnosis of a strangulated hernia, and the child did not appear to be at all sick. A hernia of the tube and ovary was not even thought of. The patient was operated on and made a good recovery.

DR. HENRY W. BERG asked what type of hernia they were considering, whether the classical femoral, or the inguinal, or the various types of ventral herniæ. It was interesting in hernia of the tube and ovary to be able to feel these in the hernial sac, but the average practitioner, not thinking of such condition, would naturally think he was dealing with some neoplasm, especially since there were no symptoms of intestinal obstruction. Dr. Berg asked whether cases of femoral hernia were more often complicated by the presence of the tube and ovary in the sac than inguinal hernia.

Dr. John Douglas said that there had been reported in the literature by Andreus, in 1907, 99 cases of hernia of the tube and ovary, but the majority of them were inguinal. There were 5 cases of the femoral variety, 4 obturator and 2 ischiatic.

DR. HERMAN C. FRAUENTHAL said that he had had at least 100 cases of Erb's paralysis at his clinic during the past few years, and that the instruction given the mothers was an important part in the treatment of these cases. They were told to place the arm between supination and pronation, and to keep it there. When the children became older, the good arm was tied inside the clothing, so that they were compelled to use the bad arm. It was important not to use too much electricity or too much massage in these cases, but to employ neuro-muscle education.

DR. HENRY W. BERG said that these cases were interesting to one who did much obstetric work. While they were all classified as Erb's paralysis, many were only cases of palsy occurring immediately after birth, which made spontaneous recoveries within a month or two. Dr. Berg said that he had seen many cases not due to traumatism stretching or pulling on the part of the obstetrician. Those cases which showed signs of hematoma in the axilla, or extensive traumatism, belonged to an entirely different group of cases. The first group were birth paralyses, which had a tendency to spontaneous recovery, while the latter group were birth paralyses, in which recovery was problematical.

THE BENEFIT DERIVED FROM THE TREATMENT OF BIRTH (ERB'S)  
PARALYSIS.

DR. HENRY W. FRAUENTHAL read this paper. He stated that his purpose was to call the attention of the members of the Section to the prevailing error in the minds of general practitioners, who believe that nothing could be done for brachial plexus paralysis. He did not understand this position, as nearly all the books on pediatrics recommended treatment in these cases. The history of this condition dated back to 1768, and a review of this literature made it quite evident that birth paralysis was due to forcible manipulation in the process of delivering the child in the majority of cases. Dr. A. S. Taylor gave the following reasons for the occurrence of brachial paralysis: (1) Backward pressure of the clavicle on the nerves. (2) Hyperextension of the forceps. (3) Pressure of the forceps. (4) Tension on the nerve roots. In breech presentations the lesion occurred in the delivery of the aftercoming head. Rotation or oscillation increased the strain on the nerve roots. Any form of traction that pulled the head and neck away from the shoulders was the exciting cause of the lesion and, as a corollary, the lesion might occur with any presentation. The condition was recognized by the fact that the arm hung helpless by the side and could not be abducted because of palsy of the deltoid and supra-spinatus muscles. The forearm was extended and could not be flexed on account of paralysis of the biceps, brachialis anticus and supinator longus. There was extreme pronation because of palsy of the supinator brevis and biceps, and the entire arm was so rotated inward that the bottom of the hand might look backward and outward. The humerus was markedly rotated inward as a result of the paralysis of the supraspinatus, infraspinatus and teres minor muscles. If the infant remained peevish and fretful for a considerable time after this accident of birth, and if handling of the extremities increased the pain and irritation, a traumatic neuritis, aggravated by pressure incident to the blood clot and rent in the perineal sheath, was present. If cases did not present these symptoms there would be more or less complete spontaneous recovery. In severe cases there was considerable contracture of the internal rotators, especially the pectoralis major. This further increased the deformity of the arm and shoulder joint. There might also be present more or less posterior displacement of the



head of the humerus, contracture at the elbow and more or less flexation, contracture and ulnar adduction at the wrist.

The results of treatment depended upon the extent of the injury, the time when treatment was begun, and the kind and character of the treatment pursued. As in other injuries, the earlier they directed their attention to assisting Nature in her reparative processes the nearer they could come to establishing a normal condition. The method of treatment outlined by the writer was the result of his experience with 100 cases of birth paralysis, in which treatment had been instituted at varying intervals after birth, from forty-eight hours to twenty-two years.

Much benefit might be expected if the child was seen immediately after birth and the ends of the lacerated nerves could be approximated. For accomplishing this, a long sleeve extending down over the hands was drawn up about the neck and fastened at the back by safety-pins, or sewing was employed. If the position was to be maintained an appliance made of soft leather might be used. This should go about the body, and lace, as shown in the photograph. A screw arrangement made it possible to hold the forearm at right angles. In the event of a blood clot being present, its absorption might be hastened by using a high frequency current once or twice daily for a period of five minutes. Following this, the writer used a combined galvanic and faradic current, interrupted seventy-two time to the minute; this was accomplished by a clock arrangement in the Victor wall plate. A contraction synchronous to the heart beat added to the efficiency of the current. The current should never be strong enough to produce pain sufficient to make the child cry. If it did this there was danger that the object of the current would be defeated and that it would cause destructive degeneration. Mild massage of the forearm and shoulder assisted in preserving the tone and function of the forearm and shoulder, but damage might be done here, too, by a too vigorous massage. When children reached the age of four years a series of exercises was added and the patient was taught to concentrate his mind on the physical effort. It was remarkable how rapidly the children learned to do this. When the child was unable to go through the motion the attending nurse assisted him, until the muscles were brought under control of the will. There might be those who would attribute these good results to Nature's spontaneous reparative work, but where good results followed in function and they still had a shortened



arm, showing injury to the trophic nerves, they could feel sure that the result was far better than would have been the case had they not aided it by treatment. In children over three years of age restricting the motion of the good arm during play would necessitate their making efforts with the arm affected by the paralysis. In 5 cases presented that had come under observation during the first two weeks after birth, Dr. Frauenthal called attention to the extent of the range of motion and to the shortened arm as compared with the good one; this latter condition confirmed the diagnosis of an injury to the brachial plexus. Dr. Frauenthal related the history of 3 cases, which were typical of many others at the Hospital for Deformities and Joint Diseases, and exhibited photographs.

DR. HENRY W. FRAUENTHAL said, in closing the discussion, that he had oftentimes been disappointed in not being able to obtain the reaction of degeneration in these cases of birth palsies. The patients, in many cases, would not submit to a sufficiently strong current of electricity to bring it out. The range of motion obtained under the treatment outlined was often surprising. In many instances, although there was the shortened arm, there was the normal range of motion. In his opinion, the presence of contractures did not affect the results very much. They were able to get a practically normal arm function by perseverance, though it sometimes required two, three, or even six years.

#### CHRONIC COLITIS IN A CHILD FOUR YEARS OF AGE, WITH DEFORMITY AND DEVIATION OF THE SIGMOID.

DR. J. FINLEY BELL read this paper. (This paper will appear in a later number of the ARCHIVES.)

DR. LEON T. LE WALD demonstrated some X-ray plates taken of the case that was presented by Dr. Bell.

DR. JOSEPH E. WINTERS said that in this baby the colitis had occurred when the child was nine months old, and that, speaking from his own experience and observation, he did not think anything better than goat's milk could have been devised for this case. Goat's milk, whenever available, gave most valuable results. It had been his experience that after the age of one year the appearance of mucus in the stools was due to milk and irrigations. The long-continued use of irrigations at any period of life would cause the persistence of mucus in the stools. In chil-

dren the sigmoid was long and was liable to become displaced. Any child with colitis would do well if fed on nothing but cereals with butter and salt. He cautioned against the use of eggs, milk and broths. Irrigations might be entirely excluded from the treatment of these cases. As Dr. Dickinson has said, the paralysis or chronic ballooning of the intestine might result from the long-continued use of irrigations. Dr. Winters cited an instance of a child brought to him from Philadelphia with a colitis which had existed from April, 1908, to October, 1909. He put the child on the dry cereal diet and within six weeks the child went home well. He cited several other instances in which he had used the dry cereal treatment with marked success, and expressed the opinion that every case of colitis occurring in children of one year, or at any age after this, with no other treatment except the use of cereals with butter and salt and no irrigations, would get well in a surprisingly short period of time.

DR. HENRY W. BERG said that he had hoped to hear some surgical opinions on the handling of these cases of chronic colitis with deformity and deviation of the sigmoid flexure. The picture, however, demonstrated that by using the bismuth meal, bringing out the outline of the stomach and intestines, the X-ray was going to be a great help in diagnosis. He knew of nothing which threw more light on these cases than injection from below of the colon and rectal tract with bismuth emulsion and then taking the X-ray picture. It should be remembered, however, that there was a source of error in this procedure and that was the relative position of the patient. The picture showed an extraordinarily large sigmoid for a child of that age, but there was no question but that the sigmoid flexure had the large number of convolutions shown. It would be interesting if someone would publish a series of pictures of children of from one to four years of age in which the normal and the abnormal would be compared. They did not possess sufficient knowledge to diagnose positively the degree of abnormality in a sigmoid as represented in the pictures shown. Dr. Berg thought the sigmoid as represented by the picture was an exceptional one and possibly required some surgical procedure to shorten it. He could not conceive of any method of therapy or feeding that would overcome such an obstruction as appeared to exist. They all knew that rachitic children had unusually large sigmoid flexures as compared with the size of the pelvis; the pelvis in

these children were, as a rule, shallow. These conditions might become normal in a growing child in the seventh, eighth, or ninth year. If one could temporize by surgical procedure or by irrigations or feeding until the child was tided over three or four years there would be hope that this disproportion of the intestinal tract might be overcome as the body grew. Dr. Berg believed that the diagnosis was of greater importance, and that they could make a probable diagnosis with the assistance of the X-ray pictures. There was too much irrigation, yet the child's sigmoid flexure and rectum should have a thorough cleaning out every day. Cathartics would not do it. He had found that those children with long sigmoid flexures that strained so hard at stool were benefited by the use of soapsuds enemas, with the addition of plenty of non-irritating oil, as sweet oil or castor oil. Many of these cases of mucous colitis were caused by hypertrophy of the coats of the transverse and ascending colon as well as hypertrophy of the mucous membrane. If they were able to keep the sigmoid clear of stools they would in all probability cure their patients. Any surgical measure employed would have in view the shortening of the descending colon and the sigmoid flexure.

DR. SARA WELT-KAKELS said she considered the case very interesting and did not think it likely that there was any interdependence between the displacement of the intestine and the colon irrigations ordered by Dr. Bell. On the other hand, the anomalous position of the large intestine might have been an etiologic factor in the causation of the colitis. It was a well-known fact that the descending colon and the sigmoid flexure were very long in infants; the sigmoid had multiple flexures; this and the long meso-colon permitted it to drop into the shallow infantile pelvis. An undue accumulation and stagnation of feces would easily result with the production of a faulty circulation and colitis. With regard to the X-ray picture she would like to suggest to Dr. Bell the rectal use of the gastrodiaephane to see if he could reach the place supposed to be the sigmoid flexure.

DR. HENRY HEIMAN said that in 1886 another condition had been described by Dr. A. Jacobi, which should not be confused with the one described to-night. Among the older children there occurred a hypertrophy with dilatation of the intestinal tract, and especially of the colon, and this caused a mucous colitis and



constipation. The two types of cases should be separated clinically. In one type a good recovery always followed because, as the pelvis grew, the descending colon would assume its normal size. Whereas, on the other hand, in Hirschsprung's disease, with hypertrophy and dilatation of the lower portion of the colon, the patients might come to operation. In a case like the one presented by Dr. Bell he would not recommend the employment of soap on account of its irritating properties; it would be far better to use the physiologic salt solution, because the treatment should be used for months and months. If the child was not gaining under medical treatment, then recourse should be had to surgical intervention.

DR. JOHN DOUGLAS called attention to another etiologic factor, the general musculature of the lower portion of the intestinal canal, and especially of the sigmoid and rectum, was deficient in tonus as compared with the rest of the intestinal tract in infants. From the medical point of view, there was in this case a colitis; from a surgical point of view this was a case of partial volvulus. There was no question regarding the diagnosis as to what was present as shown by the stereoscopic picture. Whether the mal-position was an etiologic factor of the chronic colitis or not, or whether the colitis was an etiologic factor in the production of the mal-position, he did not believe it was possible to say; however, one might be dependent upon the other—a sort of vicious circle.

The bismuth X-ray was a wonderful aid in the making of a diagnosis as well as indicating the treatment. Sometimes plates showed mal-positions in patients who presented no symptoms whatever. In cases of mal-position he believed that many could be tided over until a time when this marked disproportion between the length of the sigmoid and the rest of the intestinal tract could be corrected. Under a proper diet there should result an increase in the musculature not only of the sigmoid but of the entire intestinal tract. In nearly all these cases no surgical treatment was necessary. Those cases, however, which could not be cured by surgical means, and especially when they were losing ground, should have recourse to surgical intervention. Two operations should be considered in these cases—first, sigmoidopexy, and, second, a resection of the sigmoid. In Dr. Bell's case a sigmoidopexy might be possible and a resection avoided.

DR. ALEXIS V. MOSCHOWITZ acknowledged that he had an



untrained eye in these cases, but the patient presented by Dr. Bell did not appear to him to be very sick. The X-ray had discovered a fair-sized sigmoid flexure, but he had seen sigmoid flexures just as large in unborn babies; in fact, he had seen sigmoid flexures that occupied the entire abdomen. He did not think that anything should be done at present from a surgical point of view, although sigmoidopexy might do some good. If anything in the surgical line was done they should resect the sigmoid and do an end to end anastomosis; this was a rather formidable operation on anybody, and particularly upon an infant of three years. In his opinion, the child would make a good recovery without resorting to operative interference.

DR. J. FINLEY BELL, in closing the discussion, said that in this case not more than a half dozen irrigations were given. It was impossible in this case to get the tube above the turn in the sigmoid flexure. A point to be taken into consideration was the vesical irritation. When the bowels were evacuated the bladder irritation was relieved. Dr. Bell cited a case in an adult where a large abscess from a diverticulum caused bladder irritability. When the bowels were evacuated the bladder irritability was relieved. The question arose as to what could be accomplished by doing a sigmoidopexy. There was not only a dilatation of the sigmoid flexure, but an atrophied condition. This formed an obstruction which was the seat of the production of so much mucus.

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HOSPITAL SCHOOL FOR TUBERCULOUS CHILDREN.—E. A. Locke and T. J. Murphy (*Boston Medical and Surgical Journal*, August 17, 1911) describe the work of the open-air school and hospital established for tuberculous children in Boston, and controlled jointly by the Boston Consumptives' Hospital and the Boston School Department. The general results of treatment have, on the whole, been extraordinarily satisfactory. After admission the children show, almost without exception, an immediate improvement in their physical condition in response to the life in the open-air, rest, and feeding, and the teachers have frequently noted a striking development in the mental powers also. As a rule the children enter the routine of the school with enthusiasm, and the authors have never observed any hardship from the life in the open air, even during the most severe winter weather. On several occasions, when discharged, the child begged to be allowed to remain.—*Medical Record*.

# THE PHILADELPHIA PEDIATRIC SOCIETY.

*Stated Meeting, December 12, 1911.*

J. TORRANCE RUGH, M.D., PRESIDENT.

## ACUTE EPIPHYSITIS IN AN INFANT.

DR. JOHN F. SINCLAIR presented the history and clinical picture of this case, outlining the differential diagnosis from tuberculosis, syphilis, rheumatism, scurvy and gonorrheal infection. He also pointed out the obscure etiology and low virulence of the infection. (See p. 102.)

DR. HENRY K. PANCOAST, by invitation, showed radiograms illustrating the progress of the disease, and explaining his findings.

DR. JOHN H. JOPSON had seen this case. Tuberculosis and syphilis were both excluded. An acute infection, most probably postnatal, occurred, possibly through the umbilical cord. The wrist had probably been slightly injured and epiphysitis resulted, in this case without suppuration. The value of the radiograms in revealing the progressive improvement was well shown.

DR. JAMES K. YOUNG considered this not an epiphysitis but an osteitis, since epiphysitis is usually followed by complete destruction of the epiphysis, which did not occur in this infant. He described epiphysitis of the hip, in which the epiphysis completely disappears, with suppuration.

DR. SINCLAIR added that, before this baby was born, the mother had nursed another child with diphtheria. But this could not be proved to play any part in the etiology.

## DIPHThEROID BACILLI OF THE PENIS? WITH REPORT OF TWO CASES OF TRUE DIPHThERIA OF THE PENIS FOLLOWING CIRCUMCISION.

DR. JOHN A. KOLMER read this paper. (See p. 94.)

DR. JOPSON had seen one of Dr. Kolmer's cases, and two others. The clinical appearance is frequently characteristic, especially if pseudomembrane is present. He has noted in these cases persistent swelling with ulceration and absence of the tendency to heal, which is seen in circumcision wounds even when infected. Membrane is frequently but not invariably present and a positive culture clinches the diagnosis. The constitutional symptoms are usually mild.

DR. C. Y. WHITE spoke of the diagnosis of diphtheria as made in the laboratory of the Philadelphia Board of Health.

When rare organisms are found, cultures are reincubated and in twenty-four hours a positive result can be given. Dr. White had seen 2 cases of diphtheria following circumcision, with typical membrane. Sugar tests have given good results in England, as they did in Dr. Kolmer's cases.

DR. S. McC. HAMILL asked whether the cases reported by Dr. Kolmer and those referred to by Dr. Jopson had been exposed to other cases of diphtheria. Dr. Hamill thought that the absence of such exposure and the presence of the various types of the organism in these cases suggested a confirmation of the idea that the seemingly nonvirulent types might sometimes take on virulency. The suggestion made by Dr. White in his remarks that they had found in the Health Department that the short thick types of organisms sometimes changed their morphology on the first transfer, was a factor which might be thought of in this connection. The entire problem is a difficult one and in the light of our present knowledge and in the presence of increasing numbers of cases of diphtheria, it would seem to be the duty of the clinician to give his strongest support to the position taken by the Health Department, that all cases showing organisms of a certain class must be considered virulent until proven otherwise.

DR. KOLMER said that both of his cases gave the usual sugar tests. It is impossible to determine whether these cases were exposed to diphtheria, as they followed operation performed in the dispensary of the Children's Hospital. Neither case showed the presence of diphtheria bacilli in the nose or throat.

#### THE OCCURRENCE OF VENOUS HUMS IN CHILDREN.

DR. H. R. M. LANDIS and, by invitation, Dr. Isadore Kaufman, read a paper reviewing the literature upon this subject and the theories advanced to explain the occurrence of venous hums, with results from the observation of ninety-nine children and twenty-six adults. (See p. 88.)

DR. HAMILL said that he had been very much interested in Dr. Landis's paper, particularly because he, in conjunction with Dr. Le Boutillier, had studied these venous murmurs somewhat extensively several years ago. The results of their studies corresponded very closely to those of Dr. Landis, especially in relation to their dependence upon anemia, to the position and distribution of the murmurs and to the effect of the position of the



body upon them. He thought that in their studies they probably found the murmurs having their maximum intensely on the left side more often than Dr. Landis had. Eustace Smith's sign was elicited in several cases, but in children who had no other evidence of enlargement of the peribronchial glands, and they had referred to this murmur as having no diagnostic significance in this connection.

THE COMPARATIVE CALORIC VALUE OF VARIOUS FOODS USED  
IN INFANCY AND EARLY CHILDHOOD.

DR. CLIFFORD B. FARR showed portions of foods so adjusted as to produce 100 calories, or in certain cases twenty-five, fifty or seventy-five calories. (See p. 110.)

DR. W. S. CARNELL discussed the advance made in feeding school children. He thought that Dr. Farr's demonstration showed the relative food values very well.

DR. J. CLAXTON GITTINGS thought that the society owed Dr. Farr a debt of gratitude for the excellent demonstration, preparation for which must have consumed so much time. It is of great value not only in that it teaches us concisely certain facts of which we have, perhaps, only a hazy knowledge, but also that it stimulates us to further study of the important subject of dietetics.

DR. FARR added that, although he had emphasized the value of the method of Fisher in the preparation of diets and in the teaching of food values, he was not unmindful of other important factors. For instance a ready method of calculating the amounts of proteid, fat and carbohydrate had been provided.

A RAPID AND SIMPLE METHOD OF DETERMINING THE CALORIC  
VALUE OF PERCENTAGE MIXTURES.

DR. FREDERICK FRALEY demonstrated a simple method of determining the caloric value of the baby's food when its percentage is known. He found that twice the fat per cent. plus the sugar per cent. and the proteid per cent., multiplied by one and one-quarter times the total quantity in ounces for the day equals the total caloric value for the day's feedings. ( $2 F. + S. + P.$ )  $\times 1\frac{1}{4} Q = C.$  (See p. 122.)

DR. HAMILL said that Dr. Frawley had kindly given him a copy of his formula some months ago and that he had used it and found it not only convenient but fully accurate.



## CURRENT LITERATURE.

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### ABSTRACTS IN THIS NUMBER BY

DR. CHARLES E. FARR.  
DR. RICHARD M. SMITH

DR. S. W. THURBER.  
DR. J. HERBERT YOUNG.

### DISEASES OF EAR, NOSE AND THROAT.

GETCHELL, ALBERT C.: THE RELATION OF ENLARGED TONSILS TO ENDOCARDITIS. (*Annals of Otology, Rhinology and Laryngology*, September, 1911, p. 565.)

After citing several opinions of various authors who find a direct causative relation between tonsillitis and heart disease, the writer goes on to say that while carefully examining the hearts of about 2,000 patients who have had tonsil operations, he has been struck with the extreme rarity of heart lesions. If the tonsils for which the operations were done because of enlargement due to recurring inflammations were a definite cause of endocarditis, why would it not be shown in these numerous cases as the rule and not the exception. Again, if enlarged tonsils were so closely associated with heart disease, endocarditis should occur in that time of life when tonsillar lesions were most common; which it does not. An answer to this question should be found in the study of the bacteria of infective endocarditis and the germs common to the tonsils. The tonsils are organs upon which many bacteria lodge and they are often infected by them. Later these same bacteria may cause heart lesions, but the tonsils are the accidental and not the essential agents in this infection. The author is convinced that simple hypertrophied tonsils are rarely causative factors in endocarditis. Tonsillotomy will suffice for these tonsils, but for those evidently diseased and bound down by inflammatory tissue tonsillectomy should be done.

S. W. THURBER.

SWAIN, HENRY L.: ARE THE TONSILS A MENACE OR A PROTECTION? (*Annals of Otology, Rhinology and Laryngology*, September, 1911, p. 545.)

The author believes that the tonsils are unnecessarily subject to our surgery and asks whether this may not come from an erroneous conception of their function. The tonsils are an important part of the lymphatic system and though it is well known that they have lymphatic vessels leading to deeper glands and

nodes as far down as the interior of the chest, we fail to think of anything entering the tonsil other than through their surface. The presence of afferent lymphatic vessels is shown in the attacks of tonsillitis following rhinitis, following nasal cauterization, difficult eruption of molar teeth and inflammation of the pharynx and lateral columns. He reports a record of 150 cases where operations on the tonsils have been deferred, awaiting the eruption of the molars both in the six and twelve year periods, and when the dentition had been completed the swollen cervical glands went down and with them the enlarged tonsils.

Von Lenart has proved that tonsils had afferent vessels by injecting inert coloring matter into the nasal mucous membrane on one side and finding that it would be found in both tonsils after a proper length of time, thus showing a free anastomosis and that septic matter can find a direct channel into the tonsils.

The author asks if the lymph glands are supposed to purify the lymph and obstruct the progress of deleterious matter to the deeper structures, what is there left to prevent absorbed germs from invading these deeper organs if the lymph glands are removed, including the tonsils. One observer states that bone tuberculosis is more frequent in children who have had their cervical lymph nodes removed than it ever used to be. The author thinks that the tonsil is in all senses a lymph node and should be protected from rude destruction. His routine procedure for tonsillar troubles has been to free the upper lobe from the pillars, slit up the crypts to get rid of retention spots and then shrink the tonsil by ignipuncture. This leaves the lower part, at least, to carry on its function. Tonsillectomy in children under ten should not be done unless for known disease in the gland itself. From these too radical tonsil operations we may expect in the future of our patients early enlargement of the lingual tonsil and hypertrophy of the lateral pharyngeal columns. Perhaps there is some connection between the frequent attacks of appendicitis in children who have had both tonsils and adenoids thoroughly removed. Both are adenoid structures.

*Conclusions.*—(1) The tonsil tissue must have a function and, if so, it is in the young that it is of most value.

(2) In children with merely large tonsils and adenoids; be thorough with the adenoids, but leave some healthy tonsil tissue.

(3) In adults with evidently diseased tonsils, tonsillectomy should be done.

S. W. THURBER.

HOPKINS, F. E.: CASES OF LATE SECONDARY HEMORRHAGE AFTER TONSILLOTOMY. (*Annals of Otology, Rhinology and Laryngology*, September, 1911, p. 575.)

As a rule, following tonsillotomy, if no bleeding occurs for six days, one is safe from secondary hemorrhage. The cases cited here were two boys, one seven years old who had his adenoids and tonsils removed June 21, 1910; on the 30th he had two large hemorrhages; on July 2d the bleeding was still going on and he was vomiting the blood swallowed and showing marked signs of the loss of so much blood. A clamp was applied and the bleeding stopped. On the next day the child was well broken out with measles, which may have had a bearing on the hemorrhage. The other case was in an adult of nineteen years, who had severe hemorrhages on the fifth and tenth days.

S. W. THURBER.

THEISEN, CLEMENT F.: INJECTION OF BLOOD SERUM FOR HEMORRHAGE, EITHER SPONTANEOUS OF POST-OPERATIVE. (*Annals of Otology, Rhinology and Laryngology*, September, 1911, p. 595.)

The cases are reported to show the value of serum injections when other methods fail or the patient is so weak as to render the giving of an anesthetic for suturing the pillars dangerous.

CASE I. Boy of six years; tonsils removed by dissection and snare, and adenoids in the usual way. Very little bleeding during the operation. At the end of twelve hours, during which there was apparently no bleeding, the boy vomited a very large quantity of clotted blood which started a hemorrhage from the operative site, low down in the right tonsillar fossa. This was stopped by pressure, but during the night another very large hemorrhage occurred and he was given 5,000 units of diphtheria antitoxin and this was repeated in two hours. The bleeding lessened after the first injection and stopped completely after the second. Two more injections were given for safety. A history of severe bleeding in members of the mother's family was afterward obtained.

CASE IV. Boy of eight years, who had severe tonsillitis followed by suppurative otitis media. Several weeks afterward he was admitted to the hospital with a mastoiditis for which an operation was done and an epidural abscess also found. The leukocytes were 15,000. On the third day a severe hematuria commenced, which increased to such an extent that the patient



was becoming exsanguinated. Three injections of 500 units of diphtheria antitoxin cleared up the urine and after the fourth the bleeding stopped. This control of hemorrhage by the use of serum cannot be considered as a coincidence, because this method succeeded where others failed. S. W. THURBER.

CHAMBERLIN, W. B.: FIBROMA OF THE NASOPHARYNX, WITH REPORT OF 4 CASES. (*Annals of Otology, Rhinology and Laryngology*, September, 1911, p. 683.)

True fibroma of the nasopharynx is rare. They have their origin in the tissue covering the basilar process of the occiput, the middle lacerated foramen, the under surface of the sphenoid, the atlas vertebra and the sphenopalatine fossa. They are rapid in growth because of their rich blood supply. Extension is in the line of least resistance, but they may invade any tissue and the accessory sinuses are often involved. Because they do invade important structures they are dangerous to life and should always be removed. They are much more common in males during the second and third decades of life. A diagnosis may be made from the following points: A hard sessile growth felt or seen in the nasopharynx or posterior nares, bleeding easily and growing rapidly. It is most frequently mistaken for sarcoma and a section may have to be submitted to the microscope to determine its true structure. It shows no metastatic lesions. The danger in their removal is from hemorrhage.

CASE IV. In this report is that of a boy, ten years old, who had had increasingly difficult nasal respiration for eight months. On removing considerable nasal secretion a pale, red growth was found to be blocking the right naris posteriorly; with the post-nasal mirror a smooth, sessile mass was seen in the pharynx about the size of an English walnut. Its attachment could not be made out. The operation was done under anesthesia and the right external carotid uncovered and two ligatures placed about it but not tied. The growth, because of its firm attachment, could not be evulsed, but was removed in pieces by forceps. There was not much bleeding and the ligatures were removed from the carotid and the pharynx packed. Some days later a mass was made out in the right nasal fossa and four operations have been performed for removal of masses at intervals of two months. Otitis media has occurred. Cauterization has been tried since the last operation and the patient is still under observation.

S. W. THURBER.



BECK, JOSEPH C.: TREATMENT OF DISEASES OF THE SALIVARY APPARATUS. (*Annals of Otology, Rhinology and Laryngology*, September, 1911, p. 667.)

In one of three papers as a symposium on the diseases of the salivary apparatus, the author cites several cases in children which show interesting examples of various lesions in the young.

CASE IV. Ranula. Girl of four years had a swelling for two weeks under the tip of the tongue, causing difficulty in speaking and in breathing, as the child was a mouth-breather. The tumor was the size of a walnut, caused the child to hold its mouth open and displaced the tongue upward. It was not painful. The mucous membrane was incised, exposing the cyst wall and the cyst dissected out, the wound being sutured. Uneventful recovery.

CASE VI. Abscess of parotid. Child of three and one-half years, painful swelling of left side of face following mumps. There was a temperature of 108°F. and a tense painful swelling over the parotid about the size of a walnut. This was incised and drained of about a dram of pus and healed without a fistula.

CASE VIII. Neoplasm of parotid. Girl of eight years, who had a swelling on the side of her face about one year. It had grown more rapidly during the past few weeks; it also interfered with opening the mouth. It was not tender and there was no change in the secretion from Stenson's duct. The operation disclosed a tumor, having its own capsule connected with the ramus of the jaw and masseter muscle. It proved to be a leiomyoma or non-striated muscle tumor. Some facial paralysis resulted, but subsequently disappeared.

S. W. THURBER.

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## PATHOLOGY.

PACCHIONI, D.: PATHOGENESIS OF ICTERUS NEONATORUM (SUR LE PATHOGENE DE L'ICTERE DES NOUVEAU-NÉS. (*La Ped.*, September 15, 1911, Vol. IX., p. 448.)

Pacchioni offers a new theory on the pathogenesis of icterus neonatorum. The primary cause, he believes, is the loss of water from the tissues which takes place the first few days after birth. This loss of water makes the blood more concentrated, and is the cause of the polycythemia of the newborn. If the loss of water

is only slight there will be a moderate polycythemia without jaundice, but if the loss of water is considerable there will be a marked polycythemia and jaundice will appear. He has found this polycythemia to be most marked on the tenth to thirteenth day after birth. Because of the lack of water in the body and because the blood rich in red corpuscles furnishes an abundance of pigments the bile is more dense and viscid than normal. This thick bile being unable to flow freely through the bile capillaries is absorbed directly from the cells of the liver into the blood vessels and lymphatics.

J. HERBERT YOUNG.

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## SURGERY.

BERRY, J.: FURTHER SERIES OF 81 CASES OF CLEFT PALATE TREATED BY OPERATION. (*British Medical Journal*, London, October 28, 1911.)

The author obtained excellent results in the treatment of cleft palate by the Langenbeck operation. Union of the soft palate resulted in 58 cases out of 59 in which the hard palate was involved with the soft. In one case of complete double cleft a second operation was successful. There were 21 cases of cleft limited to the soft palate, in which primary union was obtained in 17. One case was a complete failure, and in 3 small holes persisted. These are certainly excellent results for an operation technically so difficult, and performed under conditions so adverse as regards asepsis.

CHARLES E. FARR.

SALOMON, A.: CARBON DIOXIDE SNOW IN THE TREATMENT OF ANGIOMATA AND NEVI. (*Deut. Zeitsch. f. Chir.*)

The author reports very good results in the treatment of angiomata and nevi by carbon dioxide snow. Of 250 cases in Bier's clinic, 93 were found to be permanently cured. Of these, 62 were simple angiomata and telangiectases, 21 angio-cavernomata and 10 pigmented nevi. Alcohol was used along with the snow in the treatment of cavernous growths. The snow alone was very efficacious for superficial simple angiomata and diffuse vascular birthmarks, telangiectases, and brown pigmented nevi, but was not sufficient for plexiform angiomata and cavernous growths.

CHARLES E. FARR.

BARDENHEUER, B.: SUNLIGHT IN TREATMENT OF TUBERCULOSIS OF BONES AND JOINTS (DIE HELIOTROPISCHE BEHANDLUNG DER PERIPHEREN TUBERKULOSIS, BES. DER KNOCHEN UND GELENKE). (*Deut. Zeitsch. f. Chir.*, Leipsic, October, 1911.)

The author was greatly impressed with Rollier's sunlight treatment of surgical tuberculosis. The latter, although well versed in surgery, having worked under Kocher, restricts surgical measures to puncture of abscesses. The children are very lightly clad even in winter and lie around on balconies in the sunlight. Tuberculous joints heal without stiffness and those already stiff become supple. Of 371 cases, 78 per cent. were cured, 13 per cent. improved and 4 per cent. have died. Tubercular lesions of the spine, the joints, the peritoneum, kidneys, etc., were treated successfully. Badenheuer was delighted with the results obtained by Rollier, tried it in a considerable number of his own cases, and recommends it, either with or without operative measures.

CHARLES E. FARR.

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## ORTHOPEDIC SURGERY.

RYERSON, E. W.: TENDON TRANSPLANTATION AND SILK LIGAMENTS. (*The American Journal of Orthopedic Surgery*, August, 1911.)

Ryerson uses the iodine skin disinfection, makes a curved or flap incision and uses heavy braided silk, soaked in a solution of bichloride of mercury. His results appear very good. For the ordinary paralytic drop-foot a small curved incision is made around the insertion of the tibialis anticus tendon and a strand of number twelve braided silk is fastened securely to the deep tissues and periosteum or even the bone at this point. The long end of the silk is threaded on a carrier, which is then passed within the sheath of the tendon to a point three inches above the ankle joint. Here another small curved incision is made, a small hole is drilled through the edge of the tibia and the silk drawn through it. A similar strand of silk is passed up the outer side of the leg in the sheath of the peroneus tertius or extensor communis tendon, taking its origin from the outer side of the tarsus. This strand is slipped through the hole in the tibia in the opposite direction to the first strand. The foot is then put in dorsal flexion and the two strands of silk are drawn taught and tied in

front of the tibia. By this simple method the foot is held in a correct position and the silk strands, lying under the annular ligament, are in the natural position of the tendons and will not make the subcutaneous ridges which the more superficial methods cause.

CHARLES E. FARR.

ROTH, PAUL B.: THE TREATMENT OF TORTICOLLIS. (*Lancet*, London, September, 1911.)

The author reports perfect results in the treatment of 4 cases of torticollis in children. Contrary to the teaching of the authorities, Roth advises against immobilization after the tenotomy. He insists upon the necessity of early passive and active motion, beginning passive motion on the second or third day and systematic active movements on the fifth or sixth day.

CHARLES E. FARR.

WHITMAN, ROYAL: THE OPERATIVE TREATMENT OF THE DEFORMITY OF POTT'S DISEASE. (*Annals of Surgery*, December, 1911.)

After a brief review of the more recent literature on the treatment of Pott's disease, especially with regard to the correction of deformity, Whitman takes up the recent operative treatment. He ascribes the first suggestion for operation to Hadra, who proposed to bind adjacent spinous processes by figure of eight turns of silver wire. Chipault in 1893 was the first to describe the operation with correction of deformity. Later Lange reported the use of steel wire, tin plated, in a successful case. A jacket was worn for a short time and the result was excellent. Hibbs has recently introduced an operation to cause bony union between the spinous processes and incidentally to lessen the prominence of the kyphosis, by chiselling and breaking the spinous processes in such a way as to form a continuous ridge. He also suggests the use of bone grafts from the tibia. Albee has reported 3 cases of transplantation of bone grafts from the tibia into the split spinous processes. Whitman considers operative treatment, especially indicated in early cases of thoracic Pott's. He tried the bone implantation in a boy of nine years, using a thick strong section of the anterior part of the tibia, six or seven inches long. This graft was cut in two and placed on either side of the spine after the soft parts had been pushed aside and the bony surfaces freshened. Unfortunately, the patient died six weeks after the operation of tuberculous



meningitis, although the wounds were healed and the bone grafts firmly fixed, supporting the spine in the corrected position.

CHARLES E. FARR.

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### MEDICINE.

NOBECOURT, P., AND PAISSEAU: A CASE OF ANASARCA IN A CHILD OF TWO MONTHS WITHOUT KIDNEY LESIONS (UN CAS D'ANARSARQUE CHEZ UN NOURRISSON DE DEUX MOIS SANS LESIONS RENALES). (*La Med. Infant.*, November, 1911, Vol. VIII., No. 11, p. 241.)

The authors report a case of diffuse edema in a child two months old in which at autopsy the only lesions demonstrable were in the liver. There they found large granular vacuoles replacing a considerable number of the liver cells.

RICHARD M. SMITH.

PINNINGER, W. J. H.: A SERIES OF CASES OF CATARRHAL JAUNDICE OCCURRING IN EPIDEMIC FORM. (*British Medical Journal*, November 18, 1911, p. 1,353.)

The author reports a series of cases of catarrhal jaundice occurring in an institution where there were 2,000 children living under identical conditions but divided among five houses. All the cases occurred in only one of these houses. This house contained two departments, a girls' and an infants'. The epidemic was confined entirely to the infants' department except for one patient, a girl of nine, who helps in looking after the smaller children.

The cases occurred in groups separated by from fourteen to nineteen days. This report seems to substantiate the contention that catarrhal jaundice may be a contagious disease.

RICHARD M. SMITH.

LOVETT AND RICHARDSON: INFANTILE PARALYSIS WITH SPECIAL REFERENCE TO ITS OCCURRENCE IN MASSACHUSETTS 1907-1910. (*American Journal of Diseases of Children*, December, 1911.)

The authors report the epidemic of this disease as it has occurred in the State of Massachusetts, going over in great detail all the points covered by previous reports and also discussing the symptomatology, prophylaxis, prognosis and treatment of the disease. They recommend the use of hexamethylamine during

acute stages of the disease. They conclude in regard to the prognosis that:—

- (1) Complete recovery or functional recovery occurs in something over 25 per cent. of patients at the end of four years.
- (2) Atrophy may exist without impairment of function.
- (3) In about half of the recovered patients the onset was mild.

(4) The distribution of the paralysis in such cases was not essentially different from that of cases which do not recover.

(5) The period of recovery in many instances occupied months, and in several cases from one to two years.

RICHARD M. SMITH.

DUTHOIT, R.: SERUM THERAPY OF PERTUSSIS (COMMUNICATION PRELIMINAIRE SUR LE TRAITEMENT SÉROTHÉRAPIQUE DE LA COQUELUCHE). (*La Péd. Prat.*, September 15, 1911, Vol. IX., p. 455.)

In a preliminary communication Duthoit reports favorably on the use of Bordet's antipertussis serum in 21 cases of pertussis in children between the ages of three months and five years.

J. HERBERT YOUNG.

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## THERAPEUTICS.

ROGERS, LEONARD: FURTHER EXPERIENCE IN THE TREATMENT OF CHOLERA BY INJECTIONS OF HYPERTONIC SALINES AND PERMANGANATES INTERNALLY. (*British Medical Journal*, November 18, 1911, p. 1343.)

Rogers reports the further use of hypertonic salt solutions and calcium permanganate in the treatment of cholera. He estimates the specific gravity of the blood and then gives a hypertonic salt solution to restore the normal specific gravity which is greatly increased owing to the extraction of liquids and salts by the frequent movements. In addition to this hypertonic salt solution he gives his patients a solution of calcium permanganate to drink, *ad lib.* The solution is made up of six grains to the pint. He also gives potassium permanganate in 2 grain pills, two pills every one quarter hour for the first three hours, and then every one-half hour until the stools become less copious.

RICHARD M. SMITH.

## ITEM.

BRUITS HEARD OVER MANUBRIUM STERNI IN CHILDREN.—J. E. H. Sawyer (*British Journal of Children Diseases*, July, 1910) has analyzed the bruits heard over the manubrium sterni in 65 children between two and a half and eleven and a half years of age. They were heard most often in children between the ages of four and nine. In all cases except one the bruit was louder in the neck than over the sternum. It was found that in all cases in which a bruit could be heard over the sternum it was audible in the neck, and that a bruit was often heard in the neck when the head was bent back without it being audible over the sternum. The conclusions arrived at from these facts are that in many children a bruit is produced in the internal jugular vein by the head being bent back and that it depends upon the loudness of the sound whether it can be heard over the sternum. Granting that the bruits arise in the internal jugular veins it is easy to understand how they are produced. Bending the head backward puts these veins on the stretch, and causes them to be compressed against the transverse processes of the lower cervical vertebræ. The sternomastoid muscle also compresses them, for it becomes very tense when the head is thrown back in the position required for the examination. The sternohyoid, sternothyroid, omohyoid muscles, and even the platysma may help in this compression. The stretching of the vein and its compression must diminish the size of its lumen over a certain portion, and therefore a condition is produced in the vein which is likely to give rise to a bruit. That the bruit is produced in this way is also supported by the fact that when the chin is directed to one side a bruit often appears over the side which is on the stretch. A bruit can often be made to appear in this way when previously it did not exist with the chin in the middle line. The venous hum over the sternum in children with the head thrown back appears, from these observations, to be a normal condition in the great majority of cases, and should be considered to be of no importance unless accompanied by physical signs of compression.—*American Journal of Obstetrics*.

# ARCHIVES OF PEDIATRICS

MARCH, 1912.

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## EDITORIAL.

### MINERAL SALT METABOLISM; OR, THE USES OF THE MINERAL SALTS TO THE GROWING INFANT AND CHILD.

The effect of the various mineral salts on the growing infant has come into much prominence through research, mainly that of German workers. The problems involved are practical ones. A newborn child starts with certain mineral constituents in its body, and as it grows there is a continual demand for a further supply. An infant of one year contains a good deal more of these minerals than a newborn; not only more in actual weight, but in vastly different proportions. It is therefore the problem of the pediatricist not only to furnish the requisite amount of proteid, fat and carbohydrate for the growing organism, but also to



make sure that the various minerals are both supplied and retained.

Clinical experience has shown when to vary the main food products so as best to supply the child with energy to maintain its body heat to permit of its constant activities and still to leave a surplus to be used in producing body tissue. The time has come when the pediatricist must take into account not only whether the infant is receiving these various food elements in their true proportions, but must also consider the relation of mineral salts to these food elements. For, while the salts in themselves do not act as direct producers of heat and tissue, yet it has been proven that their relation to these processes is such a close one that they can no longer be neglected.

It has been demonstrated that animals fed on any one or all of the food constituents, viz., proteid, fat or carbohydrate, from which the mineral salts have been extracted, can survive but a relatively short time. The ultimate result of such feeding is the gradual withdrawal of minerals from the body until the bones become brittle and the animal dies from mineral salt hunger.

It has also been demonstrated that the mineral salts must come to the body in organic union with the main food stuffs. In one experiment the salts were extracted, thus breaking up their close union with the food stuffs. The salts thus withdrawn were fed along with the identical foods from which they were taken, but still the animals died.

It has been shown that in some diseases there is a withdrawal from the body of certain mineral substances, and also that under other conditions the ability to absorb mineral salts becomes deficient, if absorbed, the ability to retain them in the body and utilize them for the purposes intended is either wholly lacking or greatly diminished.

It seems, therefore, that considerable attention should be given not only to determining whether the food contains all of the essential mineral salts, but whether, in a diseased infant, the absorption, retention and ultimate utilization of these mineral

products may not be the cause of such diseased condition, or, at least, contributory to it.

It is the opinion of the Finkelstein school that the mineral salts play a very large part in the various disturbances of nutrition. Indeed, it has come to be generally accepted that many of the common diseases among infants and children have their origin in a deranged mineral salt metabolism. This is not at all strange when we consider the large proportion of mineral substances necessary for the production of bone, as well as for the upbuilding and maintenance of nervous tissue. The flow of water to and from the tissues is largely brought about by the influence of sodium chlorid. Now, with an organism constantly demanding a certain proportion of this salt in its food, is it any wonder that occasionally the balance between intake and outgo becomes disturbed, resulting in edema, on the one hand, or rapid loss of weight, on the other, so often seen in the infant whose nutrition is disturbed? Again, there is the very delicate adjustment of the alkalinity of the tissues, blood and body fluids. This must be maintained at all hazards, for should there be but a slight variation toward acidity a whole train of symptoms become manifest, which we term acidosis. Not only does the organism have to protect itself from the acids of external origin, but the very organism itself is constantly producing acids which, if left wholly unneutralized, would soon cause death, but which, by an exquisite self-regulation, are neutralized by means of the alkaline elements of the body which, of necessity, must be constantly replaced.

The uses of the mineral salts, to which attention has thus far been called, are but the grosser and more evident. There are, moreover, functions which have to do with the salts in the form of their ions. This leads to the consideration of the more delicate functions, such as the rhythmical contraction of the heart, the control of body temperature, the increase of leukocytes, the influence of body weight, the precipitation and coagulation of protein, the various processes of tissue building—all these and

more have been assigned to the mineral salts in their capacity as electrically charged ions. While these last-named functions seem far removed from the every-day activities of most pediatricists, yet it is by virtue of these very functions that conditions are constantly arising which puzzle and even baffle all their efforts to control. Take, for example, the constant loss of weight of certain infants who, to all intents and purposes, are being fed on a perfectly logical formula. The trouble may not be with the fat, proteid or carbohydrate, but may be entirely a matter of salts in their proper proportions. Then again, an unexplainable temperature may cause much anxiety in the household, and even to the pediatricist himself, which should be accounted for through the influence of sodium and chlorine ions, which always produce increases in temperature when in certain concentration.

However, nature has given us a most beneficent gift in mother's milk which, in the large majority of cases, is amply provided with the necessary mineral salts, with the possible exception of iron, for the upbuildings of the body, as well as for the productive energy. In the use of cow's milk a very different problem confronts us. The mineral salts are all present in excess, except iron, but even this excess may not be a source of trouble unless there be some defect in the infant's mechanism in absorbing such salts as it needs and eliminating the remainder. Where such is the case, a far-reaching problem is at hand, involving a careful search for the particular lack.

The feeding of the young child after leaving the exclusive milk diet is a difficult one and forces the pediatricist to look to the vegetables, cereals, etc., to furnish the necessary mineral salts. The attempt to keep a child of more than a year on milk as the principal part of its diet often leads to marked anemia (milk being poor in iron). A wise choice of cereals and vegetables with true proportion of eggs, together with moderate amounts of milk, will not only supply the caloric need, but the mineral salt demand as well.

## ORIGINAL COMMUNICATIONS. 165

### AN ANALYTICAL STUDY OF TWENTY CASES OF INFANTILE PARALYSIS (POLIOMYELITIS).\*

BY A. SOPHIAN, M.D.,  
New York.

The occurrence of severe epidemics of infantile paralysis during the past few years on the Continent, especially in Norway and Sweden, and in the United States, has added considerably to the information about the etiology, mode of transmission, epidemiology and pathology of this disease.

The clinical picture depending on the different localizations of the infection in the central nervous system has been carefully studied, and the fact that the virus can cause inflammation of any part of the central nervous system, and that mild or abortive cases may occur, with slight or no paralysis, has been established.

The work of Wickman on this disease, grouping the different clinical types under the name of Heine Medinsche Krankheit, is a classic.

He divides the disease into the following forms:—

1. Spinal (the most common) poliomyelitis.
2. Landry's paralysis (the type of ascending or descending palsy).
3. Bulbar type (Medin) or Pontine type (Oppenheim).
4. Encephalitic, cerebral type.
5. Ataxic type.
6. Polyneuritic type.
7. Meningitic type.
8. Abortive type.

Types 1, 2 and 3 conform to the recognized clinical picture.

The cerebral or encephalitic type, he says, is not common; among his own cases during the Swedish epidemic, 1905, he had not had any case of the distinct hemiplegic type, but he quotes cases by others. He states that the myelitic and encephalitic forms can occur in the same individual. He quotes 2 cases occurring in sisters, one having the poliomyelitic type, and the other the hemiplegic. The clinical picture is the regular spastic hemiplegia, later on followed by chorea, athetosis, epilepsy. The differential diagnosis from other conditions, as hemorrhage, lies in the fact that the condition is acute, febrile, with constant prodromal symptoms.

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\* From the Research Laboratory of the Department of Health.



About the ataxic type (5) he says that symptoms like Friedreich's ataxia occur. He thinks that possibly changes in the cord are the cause of the ataxic form, and quotes Rissler, who showed degeneration of Clark's column.

In speaking of the polyneuritic type, he says that during epidemics of poliomyelitis cases not infrequently occur that would be regarded as acute neuritis were they to make their appearance as isolated cases. Clinically and etiologically cases of acute poliomyelitis and acute infectious neuritis, especially the forms with motor symptoms, cannot be differentiated. The pathologic anatomy of cases that die during epidemics has generally shown severe lesions in the spinal cord, while corresponding and undoubted change in the peripheral nerves have been wanting. The microscopic examination, therefore, offers no point for the contention that sometimes spinal cord, other times peripheral nerves, are attacked in the disease. Clinically, the cases present paralysis and tenderness along the nerves.

There is, however, no corresponding sensory disturbance, to examination, of the tactile, pain or temperature senses. Ataxia is present and the lesion is often symmetrical.

About the meningitic type (7), he says that there are types of the disease where the meningitic symptoms not only are premonitory and occur during the course of the disease, but where they are present without the subsequent palsies; in other words, a serous meningitis. Extreme neck rigidity can occur. Paralytic symptoms, when they occur, may be in the background, the meningitic symptoms predominating. He describes such cases.

About the abortive cases (8) he mentions the regular prodromal meningitic symptoms followed by slight transient palsy or no palsy. At the end he states that many of the cases are mixed types.

The work done in Massachusetts on the occurrence of infantile paralysis there in 1907-1908-1909 is a very careful complete study of the etiology, especially as to the epidemiology and distribution of the disease.

The report on the Collective Investigation Committee in the New York epidemic of 1907 also contains much interesting information.

They make the following statement, which subsequent epidemics certainly have not borne out: "While the committee do not doubt the rare occurrence of the cerebral (cortical) type of

the disease, no undoubted case of this form was reported, and in not a single family was it stated that one child was affected with the acute spinal form of the disease and another with the acute cerebral form."

During the epidemic of 1907 Henry Heiman studied 40 cases of poliomyelitis in New York. It is interesting to note that among these cases he had a considerable number with bulbar symptoms. In some bulbar symptoms alone were present; in others bulbar symptoms accompanied by paralysis of the extremities.

It is immediately seen in a study of the cases reported by Wickman and others that the separation into the various types, depending on the location of the lesions, is a purely arbitrary one; that many of the brain cases are apt to show a combination of the various types, depending entirely upon new areas of involvement. From a practical standpoint, it is wise, therefore, to classify the cases (as Koplik suggests) into the large groups—polioencephalitis and poliomyelitis. Both forms are accompanied by prodromal meningeal symptoms, both have hydrocephalus. The subsequent clinical picture is naturally frequently more severe in the brain forms.

In studying a group of 20 cases which I saw within a period of three weeks, I was impressed by the fact that a considerable number of these cases belonged to the polioencephalitic group. These cases, especially in the earlier epidemics, were considered to be relatively uncommon. This statement is made by Wickman in reference to the early epidemics he observed, and by the New York commission of 1907. I believe these cases to be much more common than formerly supposed. During an epidemic there are many mild, so-called abortive cases. Many of these, I believe, belong to the polioencephalitic group, with the prodromal meningeal symptoms, and very slight transient palsy, or no palsy. These cases can easily be overlooked. I will cite such cases where there was no question of the diagnosis. By careful study of the history course and clinical picture, plus lumbar puncture if necessary, a diagnosis can usually be established. There are, of course, also distinct abortive myelitic cases, with mild or transient palsy. I shall refer to all of the cerebral forms as polioencephalitis: cases will be described which will show the various types of the disease. A study of the individual cases will show that there is an overlapping of the different types.

The meningeal symptoms vary a great deal in severity, in some cases corresponding to Wickman's meningeal type. The severest meningeal symptoms, in my experience, have been present in the encephalitic type.

A number of cases showed the early lack of prostration which Koplik lays stress on. They were frequently able to be up and about for a day or two with the prodromal symptoms.

#### GROUP I. ANTERIOR POLIOMYELITIS.

Poliomyelitis is usually quite easy to differentiate after palsy develops. The usual history is one of acute onset with high fever and general constitutional symptoms; frequently the symptoms being those of an ordinary cold with coryza and cough. Headache is common, and the patient may complain of pain in the back of the neck, in the spine and legs. He may be somewhat restless; young children may have convulsions. Photophobia may be present. Physical examination at this stage, which may last four to five days, or even longer, will show a patient who is bright and rational, and shows none of the marked restlessness, hyperesthesia, irritability or delirium of a meningitis case. He is comfortable and usually does not appear very sick. The neck shows some rigidity; frequently there is no limitation of movement from side to side. Macewen's\* sign of hydrocephalus is usually present to a lesser degree. Slight Kernig may be present. Quite frequently the so-called "polyneuritis" is present; this is characterized by marked tenderness over some or all of the nerves in the affected limb. Reflexes are diminished or absent. At the end of a few days paralysis will appear, often so insidiously that they are not noticed by the patient. These may involve any of the muscles; most often the lower extremity; less commonly both; frequently isolated groups of muscles. The paralysis is flaccid, and deep reflexes are absent. Polyneuritis often becomes more marked, the patient complaining of pain, especially on active or passive movement of the limb; tenderness on pressure over all or individual nerves in the affected limb may be marked. Sensation normal. Bladder and rectal disturbance is quite common. About the time of the appearance of palsies, the temperature often comes down to normal and the patient feels very well.

\* Macewen's sign consists of a "wooden" tympanitic note, obtained on percussion of the skull over the fronto-parietal region.



Thus the picture is quite easily differentiated from meningitis, before palsies appear, by the absence of severe symptoms of meningeal irritation and cerebral disturbance. The sensorium is clear. This is strongly contrasted to the hypersensitiveness and irritability in epidemic meningitis, the marked stupor in tuberculous meningitis, and to the disturbed sensorium in both. The slight antero-posterior neck rigidity and mild Kernig is sharply contrasted to the marked neck fixation and marked Kernig in epidemic meningitis. Very characteristic is the fact that with the appearance of the palsies the temperature drops, the general constitutional symptoms clear up, whereas in meningitis these symptoms are most marked when the evidence of severe involvement, such as cause palsies, appears. Before palsies occur, the symptoms are really those of meningismus; but given a history of an acute febrile condition, showing symptoms of meningismus from the onset, without apparent sufficient primary cause, infantile paralysis should be strongly suspected. Meningismus complicating other infections, such as pneumonia in children, is most apt to appear after the primary infection has lasted at least for a short time.

CASE I. Boy, aged fourteen. Previous history negative. Well until one day ago, when he began to complain of severe headache, slight nausea, general bodily pain, some fever; temperature last afternoon,  $101^{\circ}$  F.; this morning,  $102^{\circ}$  F.; feels well this morning, headache still present, some pain in the back of the neck.

*Physical Examination.*—General condition good, patient is bright, perfectly rational, not irritable, not restless, is not very sick. Moderate antero-posterior rigidity of the neck, but rolls head easily from side to side. Marked tache, moderate Kernig, deep reflexes diminished. Blood count: Slight leukocytosis, with moderate relative lymphocytosis. Lumbar puncture: Clear fluid under high pressure.

Cytology—Cells quite numerous; lymphocytes, 94 per cent.; polynuclears, 6 per cent.

Albumin—Slight increase.

Bacteriology—Culture, sterile; spread, negative.

Twenty-four hours later the patient developed flaccid paralysis of the right lower extremity.

CASE II.—Boy, aged eleven. School. Onset sudden four days



ago, with gastrointestinal symptoms, vomiting, some diarrhea, headache marked; temperature,  $103^{\circ}$ - $104^{\circ}$  F. Complained of pain in back of the neck, held head somewhat retracted. Had difficulty in voiding his urine. These symptoms continued until the fourth day, the patient at all times being bright, intelligent and quite comfortable, the temperature gradually subsiding. During the fourth night he complained of severe pain in both legs; the next morning the physician noticed a flaccid paralysis of both legs (the boy, however, did not seem to be aware of this condition). Physical examination the fifth day: Temperature normal. Patient is bright and intelligent. Pupils react well. Slight Macewen. Slight antero-posterior neck rigidity, no lateral fixation. Flaccid paralysis both lower extremities, with quite marked tenderness over the superficial nerve. Very slight Kernig. Bladder, some retention.

#### GROUP II. POLIOENCEPHALITIS.

Polioencephalitis is a condition much more difficult to diagnose, and requires greater care in the study of the history and progression of symptoms. The presence of an epidemic of course is of help. For purposes of description, the cases may be divided into the mild, with a subdivision of the abortive type, and the severe.

(a) *Mild Forms.*—The mild cases are often not very difficult to differentiate. The onset here, as in poliomyelitis, is acute, with high temperature, vomiting, frequently symptoms of common cold, with headache and general bodily pain, or symptoms of mild or severe gastroenteritis. In young children, less commonly in the older, convulsion may be present. Cerebral symptoms are usually distinct. The patient is restless and irritable, and frequently complains of pain in back of his neck and spine. Vomiting may be repeated. Examination shows a patient who is apathetic and stuporous, but on being roused is clear and intelligent. In contradistinction is the disorientation of epidemic meningitis with the more marked irritability, restlessness, hyperesthesia and constant complaining. This I consider an important point of difference. Pupils usually respond; at first, sluggishly, or not at all. Neck shows antero-posterior rigidity, frequently not lateral rigidity; neither, as a rule, as marked as in epidemic meningitis. Macewen or bulging fontanel may be

marked. Kernig varies, usually is slight. Tache cerebrale may be slight or marked. Pulse and respiration may show irregularity from the onset, the pulse being rapid with some intermitting, the respiration deep, sighing, slower. These signs may continue for a few days, during which time pressure signs from increasing hydrocephalus may grow worse, as shown by increasing stupor, more marked Macewen, or fontanel bulging, more marked changes in pulse and respiration. Temperature may drop to normal during the first two days, or gradually subside by lysis. The palsies may first be noticed four or five days, or longer, after the onset of symptoms. It is important to remember that the patient will frequently not complain of or notice the palsy; occasionally, the palsy may be so slight, especially the face and other cranial nerve palsies, that even older children or adults cannot appreciate them. The palsies depend entirely upon the brain involvement; thus we see the facial palsy, varying degrees of ophthalmoplegia, mono or hemiplegias. These mild cases, especially, are characterized rather by partial palsy than complete paralysis, the patient still retaining considerable power in the defective parts. The affected limbs are more flaccid; the spasticity, if the extremities be affected, frequently not appearing until later; reflexes on the affected side are frequently exaggerated, though they may be absent at first. Bladder and rectal involvements are quite common. At the time when palsy appears the temperature is very apt to be low or normal, the stupor lessens and the general symptoms become less marked. Frequently at this stage, when the patient attempts to sit up, ataxia is first noticed. This form of the disease, as is seen under Wickman's classification, may be a distinct type, and may be the only symptom noticed, following the prodromal symptoms, which also may be very mild. Three cases, which I will describe, had ataxia on sitting up or attempting to walk; this was the first severe symptom noticed by the parents; 2 of the cases were only then brought to a physician for examination. These cases, as classified by Wickman, should really correctly be considered under the poliomyelitic group, as degenerative changes in Clark's column have been demonstrated in some. In all of the cases I have observed, however, Macewen's sign of hydrocephalus was marked. In 1 case considerable fluid under high pressure was removed by lumbar puncture. I am inclined to believe that in some cases the ataxia may to a very great extent be explained

by the hydrocephalus, especially in those cases recovering quickly.

A review of the symptom-complex I have described will show how readily the abortive cases fall in with this group, how, in some cases, palsy, especially of the cranial nerves, may easily be overlooked, even by careful observation, and, in other cases, palsy may be very transitory.

The differential diagnosis, therefore, from epidemic meningitis would be the absence of the active cerebral symptoms, especially of disturbed sensorium, even with evidence of a considerable hydrocephalus, as measured by Macewen's sign, fontanel bulging, pulse and respiration change, or proved by actual puncture; the greater tendency to early stupor; the less marked neck rigidity and Kernig; the early appearance of palsies, which may be extensive, as a hemiplegia. While palsies occur in epidemic meningitis, they ordinarily do not appear early in the disease, nor are they, as a rule, extensive. I have, however, seen exceptions to this. The temperature, general constitutional symptoms and many cerebral pressure symptoms often clear up in this disease when palsies appear, while in epidemic meningitis, if palsies occur, showing graver involvement, all of the symptoms become more marked, the temperature rises, pressure signs become more marked, general constitutional symptoms become worse.

Differential diagnosis of tuberculous meningitis from these milder cases should be less difficult; the acute onset in polioencephalitis is important; also the early high temperature, which rapidly came down to normal, as against the low temperature at the onset of tuberculous meningitis, with later high temperature. Likewise, the rapid progression of symptoms with early appearance of palsy in polioencephalitis, which may be extensive, as against the transient, usually not extensive, paralysis in tuberculous meningitis. With the drop in temperature in polioencephalitis, the general constitutional symptoms—headache, backache and many of the pressure signs—clear up, while in tuberculous meningitis the very opposite is the case; with the evidence of more extensive involvement, all of the symptoms become worse. Of course, lumbar puncture is the method of more exact differential diagnosis; I have found it, however, unnecessary in many cases where the history and symptoms were carefully weighed.

The group of cases already alluded to contains many of con-



siderable interest, and some of the more striking types are recorded in the following pages:—

CASE III.—Girl, aged eight. School. Previous history good. Onset sudden. Five days ago child seemed to have grip; she complained of headache, coryza, cough, pain in the back of the neck and high fever. Vomited several times. Child, however, became more stupid, and on the third day was markedly apathetic. Temperature came steadily down by lysis. Reached normal on the fourth day; at the same time she became brighter, was less apathetic, but still complained of headache and pain in the neck. Physical examination fifth day: Patient is apathetic, but answers questions readily. Macewen is marked. Neck is moderately rigid antero-posteriorly, no lateral rigidity. Pupils equal, react promptly. Some coryza, herpes present. Tache moderate. Pulse irregular, 80 (physician stated that the pulse and respiration had both been irregular since the first day of the illness). Occasionally sighing respiration. Distinct, but not marked, left hemiplegia, there being slight flatness of the left side of the face, some weakness of the left lower and upper extremities. This had not been noticed by patient or mother. Increased reflexes on the affected side.

*Summary.*—The characteristic diagnostic symptoms in this case were, therefore, the acute onset, the rapid progression of symptoms, the early appearance of palsies, the clear sensorium throughout the illness, even with apathy; the drop in temperature and clearing up of general constitutional symptoms, when, in epidemic of tuberculous meningitis, one would expect the symptoms to become worse. Note the presence of herpes. No lumbar puncture was done here; I did not consider it necessary for diagnosis.

CASE IV.—Man, aged twenty-two. Past history negative. No similar disease in neighborhood. Onset sudden, one week ago. Complained of moderate headache, some nausea, some fever, general malaise. Complained of pain in his spine and legs. After two days he felt so much better that his physician allowed him to get up. He then began to feel worse again. Temperature, 99° F. to 103° F. daily. Complained of severe headache and pain in the back of his neck. Stupor and apathy developed, so that his physician suspected typhoid. Patient at all times was perfectly bright and intelligent, not very irritable. Seventh day, physical examination: Temperature to-day ranged



from 100° F. to 102° F.; patient is perfectly bright; complains of headache; neck shows slight antero-posterior rigidity, but can be easily turned from side to side. Eyes, distinct left ophthalmoplegia; distinct left facial palsy; slight Kernig; slight tache; knee jerks not obtained. No pulse or respiratory change.

*Summary.*—My clinical diagnosis was polioencephalitis; the clinical picture being a typical one; the differential diagnosis being identical with the last case. Lumbar puncture at the request of the family physician.

Cerebrospinal fluid—60 c.c. Clear fluid—high pressure.

Cytology—Cells moderately increased in number; lymphocytes, 85 per cent.; polynuclears, 15 per cent.

Bacteriology—Spread, negative; no t. b. c.; culture, sterile.

Globulin—Negative.

Fibrin—Very slight increase.

One week later patient was entirely well; paralyses gone.

CASE V.—Girl, age thirteen months. Previous history good. Onset one week ago. Child became irritable, restless, vomited once, slightly feverish. Child did not seem very sick, so that the mother did not call a physician. One week later the mother noticed that the child could not stand; on sitting up, the child swayed a good deal, and she held her head to the left side. Otherwise she seemed well. Physical examination, seventh day: Child bright, holds head to the left side. (No torticollis.) Slightly bulging fontanel; neck not rigid. Slight flatness of the right side of the face. There is some relative flaccidity of the right upper and lower extremities, with relative increase of reflexes. Can move the extremities well, however. On sitting up, the child sways, and after a moment falls. She stands with legs spread far apart, and sways considerably (Romberg). Temperature, 100° F. Physical examination two weeks later: Palsy of the right side apparently gone. Fontanel still bulging. Child can sit up better, but ataxia on standing is still very marked. Still holds head to the left. Reflexes in the right side still relatively increased. She is still a little irritable. Temperature normal.

*Summary.*—This case, therefore, can be classed as abortive, with marked ataxia as the striking symptom. The hemiplegia was very slight and transitory.

CASE VI.—Child, age three years. Always perfectly well. Six days ago, after some supposed dietetic indiscretion, the child

began to vomit and had mild diarrhea. Became irritable and feverish and seemed to have headache. She complained of feeling tired and slept a great deal; mother noticed child's breathing was irregular, being at times very fast, other times slower; however, she did not appear very sick. Constipation, after the first day, was marked. After three days fever disappeared, all of the symptoms improved; breathing became regular. Child was much less irritable, slept less. At all times, the mother states, the child was bright and intelligent. Child now began to complain of pain in the legs, still felt tired, would not walk. Four days after the onset, child attempted to walk; she could move her limbs, but staggered so much that she fell. She then began to walk very carefully, taking short steps; she also swayed considerably on sitting up at first. Physical examination the sixth day: Child very healthy looking, bright, intelligent, somewhat irritable. Macewen is very marked. Slight neck rigidity. Pupils react well. No pulse or respiration change. Can move both legs freely. Child stands with legs spread far apart. Sways when feet are placed together (Romberg). She makes short steps in walking, and staggers. Deep reflexes not obtained. Tactile sensation is normal. Tenderness over both posterior tibial nerves, more marked over the left. There is some retention of urine. Temperature is normal. Two days later: Child is less irritable; but is still very constipated and has some difficulty in voiding urine. Macewen is less marked. There is some weakness of the left lower extremity, especially of the quadriceps group. Ataxia is still marked, but walks a little better. One week later: Child is less irritable and less apathetic. She is still constipated and has some difficulty in voiding urine. Ataxia very marked. Some weakness of left lower extremity; reflexes both sides absent. Seventh week after onset: Weakness of the left lower extremity now difficult to demonstrate. Knee jerks, both sides, appeared one week ago. Polyneuritis gone. Ataxia is still present, but much improved. Macewen very slight. Mentally, the child is entirely normal.

Two weeks later child entirely well. Examination normal.

NOTE.—The case belongs more properly to the poliomyelitic group.

*Summary.*—This case corresponds to the ataxic type. It can also be classed as an abortive case, the prodromal symptoms, as described by the mother, being quite distinct, but not making the

child very sick; the subsequent paralytic symptoms were very slight.

CASE VII.—Child, two years old. One of twins. The other twin is described under the severe cases of polioencephalitis. Child perfectly well till four days ago (about four days after the onset of the disease in the other twin); she vomited a little at the onset, developed fever, became irritable, slightly apathetic and stuporous. Temperature subsided, however, after twenty-four hours, and afterward ranged from normal to 100° F. for the next few days. She seemed to have a little pain in the back of the neck. She did not seem very sick, but all the symptoms were closely watched on account of the severe symptoms in the other twin. Physical examination, fourth day: Child bright—notices things—but irritable and apathetic. Macewen is marked. Neck slightly rigid antero-posterior, no lateral rigidity. Pupils react promptly. Moderate tache. Kernig very slight. Marked ataxia on sitting child up. No pulse or respiration change. Knee jerks not obtained. Lumbar puncture had been done on the third day, and gave a clear fluid; under high pressure about 35 c.c. removed. Report was: Globulin positive, no tubercle bacilli, no bacteria by spread or culture. No cytology count was done. Eighth day: Temperature normal, child very bright. Still somewhat irritable, less stupid. Macewen marked. Likewise, ataxia marked on sitting up. Neck, still slight antero-posterior rigidity, no lateral rigidity. No palsy. This case, therefore, was abortive, characterized by the meningitis symptoms and the marked ataxia. After two weeks the child was apparently well and about to be discharged, when she suddenly developed convulsions and died, possibly due to sudden bulbar involvement.

*Summary.*—The diagnosis of cerebrospinal meningitis had been at first suspected. Against this diagnosis was the absence of any disturbance of orientation, the child at all times being bright, the absence of much neck rigidity and Kernig, the low febrile reaction, the temperature quickly subsiding after the onset. In acute epidemic meningitis, even a mild form, showing as much hydrocephalus as this child had, the temperature would have been higher. The significant diagnostic feature was an acute onset with temperature which quickly subsided, tendency to stupor with undisturbed orientation, the mild symptoms of meningeal irritation and ataxia. A careful examination of the cerebrospinal fluid, especially a cytological examination, would have helped at the onset.



CASE VIII.—Child, aged eleven months. Breast-fed, well until five days ago, when he became acutely ill, with vomiting, moderate fever, irritability and restlessness. These symptoms continued for three days, the child at all times being bright; then partial paralysis of the left upper extremity was noticed. The palsy rapidly began to recover. The following day and to-day, the fifth day, it is almost gone. During the past two days the child has been breathing rapidly with some cough. Physical examination the fifth day: Temperature, 100° F. Child is irritable, but bright. Fontanel shows moderate bulging. Very slight antero-posterior neck rigidity. Tache is marked. Respiration and pulse are rapid, but regular. Pupils react promptly to light. Moderate, but distinct, flatness of the left side of the face. (This had been noticed for the first time this morning.) Slight weakness left upper extremity; the tendon reflexes in the extremities are not obtained. The past two days the child has been developing consolidation of the right upper lobe. This evidently accounts for the continuance of the temperature.

*Summary.*—This case, of course, would be classed as “meningismus” with apical pneumonia; the presence of the palsies, however, establish the diagnosis of infantile paralysis, with probably cord and pontine (seventh nerve) involvement. Lumbar puncture was not done on account of the pneumonia.

(b) *Severe Forms.*—The severe cases of poliomyelitis which have a high mortality may be very difficult to differentiate in the early stages from epidemic meningitis, and in the later stages from tuberculous meningitis. Some cases go on to a fatal termination within a few days.

Here the symptom-complex is much more exaggerated than in the mild cases, as to constitutional symptoms, meningeal symptoms and extent of palsy. In young children, less often in older, convulsions may be repeated, and last for days. In 2 cases I saw they continued for three weeks. The cerebral symptoms are often very marked; even with deep stupor, however, it is curious that the patients know their surroundings and answer questions. In some of the worst cases that I saw this condition persisted till the very end, and stood in distinct contrast to the markedly disturbed sensorium in advanced tuberculous meningitis. Hydrocephalus, as evidenced by bulging fontanel and Macewen, in this, as in the mild form, varies considerably, and does not go



hand in hand with the severity of other lesions. Some of the severest cases had only moderate hydrocephalus, while the milder cases occasionally had considerable hydrocephalus. Rigidity of the neck and Kernig are moderate or slight. Palsies appear early, sometimes apparently at the onset, more often a few days later; the type of palsy depending upon the lesion, many cases showing the mixed types. These cases include those with marked bulbar involvement with death from respiratory paralysis. Temperature usually is low after first few days, though high temperature may sometimes be present for days. Other symptoms depend upon hydrocephalus, and are like those described under the milder forms of the disease.

Clinical differential diagnosis as judged by physical examination alone, from tuberculous meningitis, is sometimes impossible. The history of an acute onset in polioencephalitis, with high temperature and rapid progression of symptoms, the early appearance of extensive palsy, often accompanied by a drop in temperature, is very important. In tuberculous meningitis there is a slow, insidious onset, gradually increasing stupor, slow progression of symptoms, taking days or a week before symptoms become fully developed; with the advance in symptoms, temperature mounting higher. The difference in sensorium, even with marked stupor, will be of help in many cases. Likewise, a careful study of the nature of the palsies, and their conformation to certain recognized diseases, *e.g.*, Landry's paralysis, is diagnostic.

The differential clinical diagnosis from epidemic meningitis is made by the very common tendency to early stupor, with little disturbed sensorium, as against the marked irritability and restlessness in epidemic meningitis; the early appearance of extensive palsies often involving the bulb, and often accompanied by drop in temperature, as against the frequently absent or later appearance of palsy in epidemic meningitis; the palsies being very irregular and occurring at the height of the disease with high temperature and severe general symptoms; also the frequent absence of much neck rigidity or Kernig in polioencephalitis.

#### CASES.

CASE IX.—Child, aged thirteen months, male, had always been well except for an attack of measles one month ago. Present illness, acute onset, with fever up to 102° F. Child was irritable and apathetic, but mentally appeared clear. Projectile

vomiting. He seemed to have general bodily pain, especially in the back of the neck and in the legs. These symptoms continued till the fifth day. The temperature after the first day ranged between 99° F. and 101° F. During the first few days the child appeared to have difficulty in swallowing. "His tongue seemed to get in his way," his mother said. Physical examination the fifth day: Child is apathetic and stuporous, but is readily roused, when he is somewhat irritable; he seems, however, to recognize things about him. Child is aphonic. Swallowing affected as mentioned. Moderate Macewen; neck is slightly rigid antero-posteriorly, but not laterally. Mild left facial palsy. The breathing is almost entirely abdominal; there is practically no movement of the right side of the chest, a little better movement on the left side. The breathing is slow, irregular, with long periods of intermission. Pulse is rapid, 120, occasionally irregular. Child is perspiring quite profusely about the head. Both lower extremities show a complete flaccid paralysis, with foot drop. The arms show partial flaccid paralysis, but can still be moved, though with difficulty. Knee jerks, ankle jerk, wrist and triceps reflexes not obtained. Plantar reflex is present. No Babinski. The reflex on the right side of the abdomen is diminished, the left normal. There is exquisite tenderness on pressure over the superficial nerves in both lower extremities; there is also pain on flexing and extending the legs on the thigh. Tactile sensation apparently present. Lumbar puncture, 30 c.c. clear fluid, moderately increased pressure.

Moderate increase of fibrin content.

Cytology—Cells numerous; lymphocytes, 98 per cent.; polynuclears, 2 per cent.

Bacteriology—Spread, negative; no t. b. c.; culture, sterile.

Albumin—Moderate increase.

Globulin—Positive (not, however, as strong as in tuberculous meningitis).

Sixth day: Paralysis increasing in both upper extremities; still able to bend the right wrist and fingers. Temperature, 100°-101° F.

Seventh day: Condition about the same.

Eighth day: Mentally a little brighter, but still very stupid. Palsies the same. To-day temperature higher, 102° F. Perspiring profusely. This morning mother says child has more mucus in the throat. (The child is having marked dyspnea with

dilatation of the ali nasi, and is using its accessory neck muscles of respiration; the breathing is very rapid, with considerable abdominal movement. No movement of chest. Evidently, respiratory paralysis coming on. Beginning pulmonary edema. Lost right abdominal reflex. In twelve hours child died from respiratory paralysis.

*Summary.*—Typical Landry's type of the disease. An acute onset, with very rapid progression of palsies. This case also showed the marked polyneuritis, and the ability to recognize things till the very end, even with deep stupor. Hydrocephalus was only moderate. Temperature low throughout. Note the profuse sweating.

CASE X.—Baby, female. White. Aged seven months. Breast fed. Always well. Onset sudden, with vomiting, gastroenteritis, some fever; temperature,  $101^{\circ}$ - $102^{\circ}$  F.; irritable, restlessness, retraction of head. The following day the child became more stupid, retraction of the head became more marked; gastroenteritis improved. Third day of illness: Child was apathetic, stuporous, but hypersensitive on being disturbed. The eyes are wide open and she at all times seems to recognize things. Aphonia complete. Fontanel is slightly bulging. Neck, slight antero-posterior rigidity. Breathing is very much disturbed; is irregular, with period of intermission, is almost entirely abdominal, very slight movement of chest. Constant twitching, with occasional clonic spasm, of the right upper and lower extremity; also occasional twitching of the other extremities. There is distinct relative flaccidity of the right lower extremity. Kernig slight. Reflexes, both upper and lower extremities very much increased. Tache is marked. Pulse rapid, moderately irregular.

Lumbar puncture by Dr. Neal, who is associated with me in the Research Laboratory, 5 c.c. sl. turbid yellow fluid, which formed a solid coagulum.

Cytology—No cells.

Bacteriology—Spread, negative; culture, sterile.

Globulin, + + +.

Albumin, + + +.

In sediment were seen crystals, which Dr. Neal considered to be blood crystals.

Sixth day: Condition about the same. The child is somewhat more stuporous, but still appears to follow objects with the eyes.



Temperature low, 100°-101° F. Twitching of the extremities continues. Respiration entirely abdominal, no chest-wall movement. Fontanel flat.

Seventh day: Nystagmus is marked. Twitching of the extremities is more marked. Temperature, 100° F. Lumbar puncture, Dr. Du Bois.

10 c.c. cerebrospinal fluid, very bloody; low pressure.

Cytology—Many red blood corpuscles; many polynuclears (probably from the blood).

Bacteriology.—Spread, negative; culture sterile.

Globulin, + + + }  
Albumin, + + + } unreliable on account of blood.

Ninth day: Child is very stupid, but eyes are wide open, and still appears to notice things (at least is brighter than a tuberculous meningitis).

The fontanel is flat. Very slight antero-posterior neck rigidity, no lateral rigidity. Aphonia absolute; respiration irregular and abdominal in type; pulse irregular, 120; marked constant tonic and clonic spasms and distinct spastic paralysis of the right upper extremity; re flexes of this extremity and also of the others very much increased. Abdominal reflexes not obtained. Child died twenty-four hours later. Total course, three and one-half weeks.

*Summary.*—A severe case, lasting three and one-half weeks, with convulsions throughout. The history was one with an acute onset, with fever and early appearance of cerebral symptoms; there was a rapid progression of the disease, with early appearance of bulbar palsies. There was also spastic paralysis of the right upper extremity. No distinct facial paralysis was noticed. Throughout the child was stupid, but almost till the very end appeared to notice things, and was brighter than a case of tuberculous meningitis. Hydrocephalus was never marked, and temperature, after the first two days, was low throughout. Clinically against epidemic meningitis was the absence of febrile phenomena, with other symptoms very severe, the early stupor, the early paralytic phenomena, the absence of much neck rigidity or Kernig. The findings in the cerebrospinal fluid were very interesting, showing in the first examination the presence of an old hemorrhage into the canal; and in the second examination the presence of a fresh hemorrhage.

CASE XI.—Aged two years. (Physician's note, Dr. Stone.)



Onset four weeks ago, with high temperature,  $104.4^{\circ}$  F., vomiting and general convulsions; the following day temperature was  $100^{\circ}$  F., and the child had paralysis of the right upper and lower extremities. Fourth day of illness, paralysis improving, child feels well, is playful. Temperature,  $100.6^{\circ}$  F. Sixth day, paralysis very much better. Temperature,  $100^{\circ}$  F. The child then continued in apparently good condition till nine days later, when she again developed fever, became stupid, held her head retracted and spine rigid. Vomited and had repeated general convulsions. The following day the physician noticed paralysis of the left upper and lower extremities. Physical examination on the third day of the present attack. Child is very apathetic and stupid; breathing is deep, irregular; the first impression is that the child has tuberculous meningitis. She is, however, irritable on being disturbed, opens her eyes and seems to notice thing much better than a case of tuberculous meningitis would at this advanced stage of the disease. Fontanel is bulging. Eyes are deviated to the right; the pupils react promptly. Neck is not rigid. Tache is marked. Pulse is 110 and irregular. There is a complete left hemiplegia, involving the face, upper and lower extremities, the involved extremities being flaccid. Reflexes are generally increased, more on the paralyzed side. Babinski left side. Pain sense is present. Kernig absent. Temperature high.

Lumbar puncture—90 c.c. clear fluid under very high pressure.

Cytology—Cells moderately increased in number; lymphocytes, 90 per cent.; polynuclears, 10 per cent.

Bacteriology—Spread, negative; careful search for tubercle bacilli, negative.

Culture—Sterile.

Globulin—Weakly positive.

Albumin—Increased slightly.

*Summary.*—From the clinical symptoms alone, this type of the disease is most difficult to differentiate from tuberculous meningitis; the history of the onset and course, however, is very important; also the early onset of extensive palsy, and the brighter mental state, with very advanced symptoms. This case showed the very considerable hydrocephalus, which is more common in tuberculous meningitis. An interesting feature was the occurrence of what seemed to be a relapse after the first attack

of palsy. It was difficult to establish from the history whether the palsies in the first attack were cerebral or myelitic in origin.

CASE XII.—Aged two years. Twin of Case VII. Past history good. Onset sudden five days ago, with vomiting, moderate fever, restlessness and irritability; some apathy at times; he was treated for gastric enteritis at first, but in spite of treatment did not improve. Four days later he developed repeated convulsions, which have continued on and off up to the time of the present examination. Has become very stuporous. Temperature was 102°F. at first, since has ranged between 100°F. and 101°F. On the fourth day no palsy was noticed. Physical examination the sixth day: Child is unconscious, but is extremely restless on being disturbed, when he appears to notice things at times. Moderate Macewen. Slight antero-posterior neck rigidity, no lateral rigidity. Eyes—pupils react to light. Eyes deviated at times to the left, other times to the right. Distinct left facial palsy. Possibly some relative flaccidity of the left upper and lower extremities as compared to the right. Deep reflexes both sides not obtained. No Kernig. Breathing is deep sighing, with irregular period of intermission. Pulse 115, regular. Tache quite marked. (Occasional twitching of the left arm and leg had been noted on the fourth day.) Ninth day, child is still very stupid, but eyes are open, seems to notice things, and pushed my hand away during the examination. Child does not utter sounds. (Aphonia?) Slight Macewen on the right side. Slight neck rigidity. More marked flatness of the left side of the face. There is also constant twitching of the right side of the face. Distinct flaccid paralysis of the right upper and lower extremities; reflexes both sides still not obtained.

Report ten days later from Dr. Quinn: Child is more intelligent, but still very stupid. Temperature has been practically normal since last note. Occasional twitching still present of paralyzed side.

*Summary.*—An acute onset with typical history of general constitutional and mild meningeal symptoms, moderate fever at the onset. Followed in a few days by lower temperature, convulsions and a number of cerebral palsies, including a right hemiplegia and a probable aphonia. Sensorium, even with the severest symptoms, was not entirely obscured. Hydrocephalus was only moderate at first, later slight.

Blood count tenth day—White blood cells, 8,000; polynu-

clears, 31 per cent.; large lymphocytes, 26 per cent.; small lymphocytes, 25 per cent.; (probably large lymphocyte, somewhat suggestive of myelocyte?) 16 per cent.

Lumbar puncture, fifth day—About 30 c.c. clear fluid under moderate pressure. Report from another laboratory was: Culture, sterile; globulin, +; no tubercle bacilli. Cytology was not done.

Sixth day—*Very turbid fluid.*

We examined this fluid in the Research Laboratory, 20 c.c., low pressure.

Cytology—Polynuclears, 60 per cent.; lymphocytes, 40 per cent.; cells numerous.

Bacteriology—Spread, negative; no organisms seen; culture, sterile.

Globulin, + +.

Albumin, + +.

I attributed this purulent fluid, following twenty-four hours after a perfectly clear fluid, as probably resulting following the use of the antimeningitis serum; the serum causing a leukocytosis.

Lumbar puncture, ninth day—10 c.c. perfectly clear fluid, no fibrin flakes. (This fluid was not sent to the laboratory for examination.)

CASE XIII.—Girl, aged six and one-half years. School. Onset sudden one week ago, with headache, nausea, fever, pain in the neck, in the spine and legs. Bowels constipated. These symptoms continued for a week, the child becoming progressively more stuporous, but when aroused was always bright and intelligent. Temperature moderate, ranging up to 102° F. The physician said the child's neck showed moderate rigidity throughout, and that the respiration had been normal and regular till the seventh day, when breathing became rapid and irregular; at this time mother also noticed child had difficulty in swallowing. Physical examination, seventh day: Child is very apathetic and stupid, falling asleep during the examination. She is also somewhat irritable. She is, however, easily roused, when she is perfectly clear and intelligent. She declared that she felt no difference in power in any of her limbs. Macewen's sign is distinct. Neck shows moderate antero-posterior rigidity, but absolutely no lateral fixation. There is slight but distinct flattening of the

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\* I wish to thank Dr. Quinn and Dr. Grier, of the Elizabeth General Hospital, for their courtesy in furnishing me with the records of this case and Case 7.

left side of the face. Breathing is rapid, almost entirely abdominal, occasionally sighing and irregular. Pulse is rapid, 135, no irregularity. Tache is moderate. There is distinct weakness and some spasticity of the left upper extremity, deep reflexes increased. The left lower extremity is flaccid, can be moved with effort, and shows a distinct palsy; the deep reflexes are markedly increased; Babinski is present. The reflexes on the other side are slightly increased. Kernig on both sides slight. Tactile sensation normal.

The picture therefore is one of an acute onset, with fever, rapid progression of symptoms with extensive paralysis and bulbar symptoms, some irritability, marked stupor, but no disturbance of orientation; only indifferent neck rigidity and Kernig. Hydrocephalus moderate, as shown by lumbar puncture. Clinical differentiation from epidemic and tuberculous meningitis was therefore quite distinct, as judged by the acute history, mild febrile course, early and deep stupor, but clear sensorium throughout, the early appearance of extensive palsy, hemiplegia, and bulbar involvement, the slight neck rigidity and Kernig, the moderate hydrocephalus.

Lumbar puncture—40 c.c. clear fluid. Moderate increase in pressure.

Cytology—Moderate increase in number of cells; lymphocytes, 98 per cent.; polynuclears, 2 per cent.

Bacteriology—Spread, negative; no tubercle bacilli; culture, sterile.

Globulin—Weakly positive.

Albumin—Slight increase.

Fibrin—Slight increase.

(Twelve hours later the child died from respiratory paralysis.)

#### TABLE I.

20 CASES STUDIED DURING THE FALL EPIDEMIC OF 1911.

##### *Forms.*

1.—Myelitic (regular poliomyelitis), 3 cases. In all, both lower extremities paralyzed.

2.—Landry's paralysis, 1 case. Paralysis of both lower, both upper extremities, intercostal muscles, bulb, left side of face.

3.—Abortive cases, 4.

No paralysis, ataxia, 1 case.



Slight, temporary quadriceps, paralysis with ataxia, 1 case.

Temporary paralysis right side of face and arm, 1 case.

4.—Polioencephalitic, cerebral forms, 12 cases.

Hemiplegia in 5 cases; bulbar involvement in 3.

Ophthalmoplegia (complete), 2 cases, associated with left facial palsy in 1 case, and with palsy of the left lower extremity in the other.

Bulbar involvement, alone, 1 case.

Bulbar involvement, with paralysis of one upper extremity, 1 case.

(See 3 cases of bulbar involvement with hemiplegia.)

Isolated paralysis, 2 cases.

Left facial, right facial and right upper extremity, 1 case.

Left upper extremity, left side of face, internal left eye, 1 case.

NOTE.—1 case with left facial palsy, and a left arm paralysis, the latter possibly myelitic in origin.

Ages of cases ranged from three weeks to twenty-two years.

CEREBROSPINAL FLUID.

	Normal	Meningism	Polioencephalitis	Cerebrospinal Meningitis	Streptococcus Pneumococcus Influenza, etc. Meningitis	Tuberculous Meningitis
Color	Clear	Clear	Clear, occasionally bloody, from fresh or old hemorrhage	Cloudy, pus sediment	Cloudy, pus sediment	Clear, white flakes, fibrin-network
Pressure	Low escapes slowly drop by drop	+	+ to ++ to +++	++ to +++	++ to +++	+++
Quantity	Little-few c.c.	(Up to 50 c.c. or more)	(Up to 50 c.c. or more)	(Up to 100 c.c. or more)	(Up to 100 c.c. or more)	(Up to 100 c.c. or more)
Cytology	Few cells, leukocytes and endothelial	Few cellular elements	Cells increased in number Lymphocytes 90% or more	Cells numerous (polynuclear up to 100%)	Cells numerous (polynuclear up to 100%)	Cells numerous (lymphocytes up to 50%)
Bacteriology	Sterile	Sterile	Sterile	Meningococcus	Infecting organism	Tubercle bacillus
Albumin (nitric acid test)	Faint trace	Trace	Trace to ±	+++	++	+
Globulin test	Negative	Negative	Positive in early stages	+++	+++	+

NOTE.—Where tubercle bacilli are not found in spread from the sediment, animal inoculation, if case is tuberculosis, will produce tuberculosis within six weeks.

NOTE.—The cerebrospinal fluids in paresis and other syphilitic conditions in general appear to give a positive globulin reaction; a total increase in cellular elements, with lymphocytes up to 80 per cent. or more. Many of these fluids give a positive Wassermann reaction. The clinical study of the cases usually establishes the diagnosis.

The characteristic findings in the cerebrospinal fluid in infantile paralysis are principally in cytology and globulin determinations. The fluid is usually clear, occasionally bloody, either showing the presence of an old hemorrhage (see Case X.) or of a fresh hemorrhage, with bright red blood.

Globulin varies in quantity in different periods of the disease; it is frequently positive early in the disease, but may persist throughout the whole course, as some of our severe cases showed. After paralysis appears, the test is usually negative or very weakly positive. In my experience, the increase of globulin, even at its height, is usually in smaller quantity than in tuberculous meningitis; in my cases, it was relatively about one-half as strong, as shown by the Noguchi test.

The gross microscopic increase of fibrin goes hand in hand with the globulin content. That also, at its height, is usually much smaller in quantity than in tuberculous meningitis.

The cytological examination is also of considerable help, especially early in the disease; in the subcutaneous chronic stages the cells may be very few in number, differing little from the normal. In the acute stages, the cells are moderately increased in number, occasionally as numerous as in tuberculous meningitis (tuberculous meningitis regularly shows a large increase in the number of cells). The lymphocytes in both conditions may range up to 100 per cent.; in infantile paralysis, however, the relative number of lymphocytes is very apt to range lower, 80 to 90 per cent.

Almost all of our fluids were sterile; a few showed organisms, which we proved to be contaminations.

The diagnostic features, therefore, of the cerebrospinal fluid, in infantile paralysis, are negative or weak globulin reaction;

slight, other times, no increase in gross fibrin content, plus moderate increase in the total number of cells, the differential count showing a high lymphocytosis. This is in contrast to the fluid in tuberculous meningitis, which shows a uniformly strong globulin reaction, considerable increase in fibrin and numerous cells, with a high lymphocyte count.

The pressure and quantity of the cerebrospinal fluid depends on the hydrocephalus. Only moderate hydrocephalus is rather the rule in this disease, as contrasted to a very frequent marked hydrocephalus in tuberculous meningitis.

The fact that tubercle bacilli can be found in from 90 to 100 per cent. of tuberculous cases, in the examination of the first specimen of cerebrospinal fluid is very important. A negative result, therefore, in suspected poliomyelitic fluids, is significant. The final test in all suspected fluids is the guinea pig inoculation test for tuberculosis.

Blood count, in my experience, does not show constant changes. Experimentally, in monkeys, Lucas and others have shown a moderate to a marked leukopenia with a moderate relative lymphocytosis. While this is seen at times clinically, at other times a moderate leukocytosis with relative lymphocytosis is seen (Case I.) Other cases show leukocytosis with some relative polynucleosis, or no distinct change.

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THE RELATION OF THE WASSERMAN REACTION TO SYPHILIS, ESPECIALLY IN CASES TREATED WITH 606.—C. Lange (*Berl. klin. Woch.*, page 1,656). The author presents the case of a nursing infant treated twice with an injection of 0.015 g. of 606. This child had a maculo-papular exanthem. After treatment the child gained in weight, the skin eruption disappeared, and there were no further symptoms for three and one-half months, when a staphylococcic pemphigus appeared, which was not like that of syphilis either in form or localization. A third injection of 0.02 g. of 606 was given. The pemphigus underwent spontaneous cure, and since that time the child has steadily improved.

## A QUICK MACROSCOPIC AGGLUTINATION TEST.\*

BY JOHN RUHRÄH, M.D.,

Baltimore, Md.

Bass and Watkins (*Archives of Internal Medicine*, December, 1910, p. 717) have proposed a method of making the typhoid agglutination test in a manner which is wonderfully simple and, if it bears out their claims, will place this valuable test within the possibilities of every practicing physician.

All that is needed is an ordinary microscope slide or other piece of glass, a surgical or some other puncture needle, and an ordinary medicine dropper. A suspension of dead typhoid



FIG. 1.\* Method of holding slide while rocking it to hasten agglutination, and also proper position of slide for reaction to be seen.

bacilli is used in the strength of 10,000 million typhoid bacilli per cubic centimeter in 1.7 per cent. sodium chloride solution, to which 1 per cent. liquor formaldehydi is added. This can be readily prepared by any one familiar with the making of standardized bacterial suspensions. It is a stable test solution. and may be marketed without difficulty. By using their method the relation of each bacillus to the amount of serum used is

\* Read at the Twenty-third Annual Meeting of the American Pediatric Society, Lake Mohonk, June 1, 1911.

\* These illustrations are from the article by Drs. Bass and Watkins from *Archives of Internal Medicine*, Vol. VI., pp. 717-729. The plates have been kindly lent by publishers.—[Ed.]



about the same as that used in the ordinary Widal reaction, and they purposely made it conform to the ordinary standard requirements, although they believe that there is good reason for increasing the quantity of blood per bacillus in all agglutination tests, but they hesitate to change a well-established standard.

The test is made by diluting the blood with four times its volume of water. One or two drops of this diluted blood is placed on a microscope slide with an equal quantity of the test

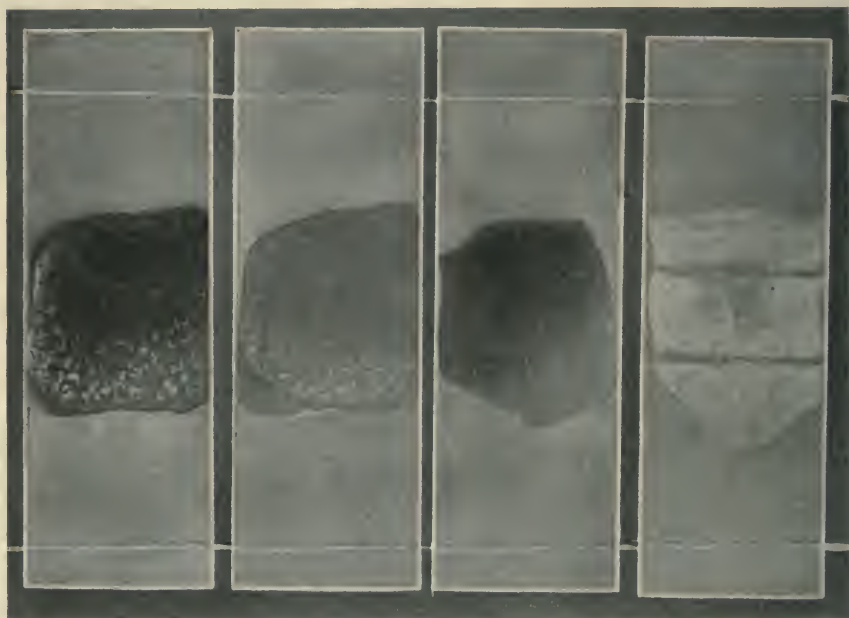


FIG. 2. Proper blood specimen and reaction in typhoid agglutination test; (a) good spread of blood for test; (b) negative; (c) weak positive; (d) very strong positive.

fluid and the slide is tilted from side to side, or from end to end, so as to keep the mixture flowing back and forth. If the reaction is positive, a grayish mealy sediment appears within one minute, usually within less than that time. This consists of agglutinating bacilli and is seen with the unaided eye. It appears in the fluid around the edges first and tends to collect there. If the agitation is continued the clumps increase in size for two or three minutes. In the blood that gives a weak reaction the appearance of the sediment is not as rapid as with the stronger reacting blood. It is useless to continue the test longer than

two minutes, for if the reaction has not occurred in two minutes it will not occur at all. When the reaction is negative no agglutination occurs and the mixture remains as clear and unchanged as when placed on the slide.

When they first started to make the test they put 1 drop of blood in a small bottle containing 4 drops of water. Recently they have improved on this, although possibly at a slight sacrifice of accuracy, by spreading approximately one-fourth of a drop of blood on a slide and dissolving this with a drop of water. This one-fourth of a drop of blood is about the quantity used for making blood slides in examinations for malaria, differential counts, etc. The drop of water should



FIG. 3. Method of holding slide and spreading the drop of water over the spread of blood on slide to dissolve it.

be spread over the blood with a clean toothpick or a matchstick. As soon as the blood is dissolved, which it will be in less than one minute, 1 drop of the test fluid is added, the mixture agitated and the reaction noted. The specimen may be examined at the bed-side or carried away and examined at some convenient time. Specimens of dried blood may be diluted with approximately four times their volume of water, and any undissolved particles in the solution should be allowed to settle to the bottom. These, or dust particles, or débris from an unclean slide, dropper or water, may be mistaken for a positive reaction by those not familiar with the test.

In passing, it might be noted that Bass has suggested a very convenient needle for the puncture, consisting of a surgical needle thrust into a cork which fits into a small bottle in which

may be kept a small quantity of alcohol. This is inexpensive, easily made, conveniently transported and always sterile. (Bass, *Medical Record*, 1910, Vol. XXVIII., p. 538.)

The advantages of the Bass and Watkins over the usual method are that it requires only two minutes instead of an hour to make the test. It is not necessary to have any laboratory experience, microscope or other laboratory facilities. The expense of each test should not exceed one-half of one cent, whereas the



usual charges for agglutination tests made in the laboratories are from one to five dollars. Tests can be made every day without sacrifice of time or money until the case is diagnosed. Tests can be made at the bedside, when the information it will furnish is most desired.

They have used this test for over a year along with the ordinary Widal and believe it to be just as reliable. They also call attention to the fact that the same principles and technique can very probably be applied to other diseases in which specific agglutinins are formed by substituting the appropriate bacteria

for typhoid bacilli. Different strains of typhoid bacilli and the paratyphoid have been tried successfully.

My own experience with this test has been rather limited, but thanks to Dr. Bass sending me the necessary suspension I have been able to try it. In infants and children it seems to give trustworthy results. In all cases of typhoid it has been positive and in all other diseases negative. I have not had occasion to try it in persons who give the ordinary Widal after an attack of typhoid several years previous.

My reason for calling your attention to the test is that the original article of Bass and Watkins does not seem to have attracted the attention which it merits, and a test so simple, and if reliable so valuable, should be carefully studied to determine its true worth.

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THE TREATMENT OF A SYPHILITIC INFANT BY TREATING THE MOTHER WITH 606.—Von Taege (*Muench. med. Woch.*, 1910, No. 33). A patient of the author's, who had manifest lues, was injected with 0.3 grams of 606 ten days after childbirth. Three days later syphilitic condylomata began to disappear, and spirochetæ were difficult to find. The child at birth weighed 2,400 grams. It was well developed, but appeared pale, shrivelled, and aged. It did not cry. It was apathetic and would not take the breasts well. On the ninth day pemphigus and paronychia of some of the fingers appeared. At this time the mother received treatment. For two more days the condition of the child continued to become worse, but on the third day after the treatment of the mother all of the symptoms came to a standstill. After this the symptoms began to show a rapid improvement. The grey faded color gave way to a normal red tinge; the infant cried lustily and emptied the breasts. The manner in which this apparent cure was brought about is difficult to explain. At no time could the presence of arsenic be demonstrated in the milk. A possible explanation offered by Ehrlich is that the rapid killing off of a great number of spirochetæ in the mother set free endotoxin, which in turn resulted in the formation of an antitoxin. This antitoxin, excreted through the milk, resulted in the seeming cure of the child.



## THE BASS-WATKINS TYPHOID AGGLUTINATION TEST.

BY LEON J. MENVILLE, M.D.,

Houma, La.

To be able to properly diagnose a case of typhoid fever in a child is at its best a difficult thing, more particularly so in the country where the preparation of cultures every day for the Widal test is practically impossible. I have used for some time the macroscopic Widal to some satisfaction, but the usual package is bulky to carry and you have to wait a long time for a reaction, and the interpretation of this reaction requires some practice. The most objectionable thing to the use of macroscopic and the ordinary Widal reaction in children is the pain which is caused by the puncturing the ear, as it is necessary to draw some few drops of blood, while in the method I am about to describe only one-quarter of a drop is needed. The pain in drawing this small quantity of blood is so little that our little patients hardly feel it.

I have been using Bass-Watkins typhoid agglutination test for the last year on some 80 cases and got a positive reaction in all cases that were typhoid, although in some the reaction was not so marked as others. The following few cases will show the usefulness of the reaction more particularly in children. It causes no pain to the patient, is easily carried in the vest pocket, the test is made at the bedside, and there is no need for a microscopic agglutination test.

CASE I. J. B., five years old, was taken sick on the morning of June 9th with pain in his head, arms and legs, with moderate fever. His bowels moved the next morning freely from a dose of calomel and have moved daily since then. The movements were loose but normal. There had been no cough or nose bleed. The pain in the head increased and temperature gradually rose to 104.3°F. He was seen on the morning of June 16th.

*Physical Examination.*—His color was good. There was no eruption. He suffered from pain in his head, arms and legs, but nothing else. Pupils were equal and reacted to both light

and accommodation. The ear drums were normal. His tongue was dry and coated; there was no tenderness or rigidity of the neck. The heart was normal. The lungs were free from disease. The liver and spleen were not palpable. The knee-jerks were equal and lively. Kernig's and Babinski's signs were absent. The temperature by mouth was 105°F., the pulse 108, respiration 26. The diseases which were suggested by the history were pneumonia, meningitis (more probably cerebrospinal than tuberculous), influenza and typhoid. I used the Bass-Watkins test and got a positive reaction, which subsequent clinical manifestations corroborated. The child was sick for three weeks and made an uneventful recovery. In this case the test simplified matters greatly.

CASE II.—W. B. M., three years old. There was no tuberculosis in the family and no known exposure to tuberculosis. He had always been well.

It was found that on October 5th his appetite was poor and he seemed dull, sleepy and tired. His condition remained unchanged although he was up about the house until October 12th, when he took to bed. During the night and early morning he vomited and appeared decidedly worse, becoming very cross and irritable but remaining conscious. He vomited again on the 13th. Bowels very much constipated, requiring enema. That night he began to cry out as if in pain. Was seen on October 14th.

*Physical Examination.*—He was well developed and nourished, but seemed very sick. He was conscious, but unable to speak plainly. He was still very irritable and cried out as if in pain. There was double convergent strabismus, eyesight was good. The pupils were dilated and equal and reacted to light. The tongue was dry and coated. There was no herpes. The heart and lungs were normal. The liver was not enlarged, but the spleen was apparently enlarged somewhat upward. There were no rose spots or nose bleed. There was no spasm or paralysis of the extremities. The knee-jerks were normal. Kernig's and Babinski's signs were absent. Temperature taken per rectum was 103° F., the pulse 108, the respiration 30. Examination of the urine showed it to be markedly acid, specific gravity of 1.026, no sugar or albumin.

*Diagnosis.*—The early history would point to nothing but a disturbance of digestion. The history on the whole points to

tuberculous meningitis more than to any other condition, although typhoid fever with meningeal irritation would need to be considered. I made a Bass-Watkins test and it was positive. Child was sick for seven weeks. Subsequent events showed it to be a case of typhoid fever.

I could enumerate a number of similar cases where the Bass-Watkins test saved me and my patients much worry.

The test is in itself very simple. The direction as given by Dr. Bass is as follows: Puncture the ear lobe with the lancet, and let flow or well up by squeezing the part, approximately one-fourth drop of blood. Take this up on a clean slide by touching it with the slide about one-third its length from the end. Place the end of another slide in the blood and spread it out without pressure. The entire one-quarter drop should be left on the middle of the slide. The test may now be made at the bedside even before the blood dries, or it may be allowed to dry and may be examined upon the return to your office, or next day, or the next week, or within the next month or two if desired.

To make the test, dissolve the one-fourth of blood on the slide with one drop of ordinary clean water. Drop the water on the blood with the dropper and with a clean wooden toothpick or match stick spread the water carefully over the blood. Within one-fourth minute the blood is completely caked. Now with the same dropper place one drop of the typhoid suspension on the center of the diluted blood. While holding the slide in the hands tilt it from side to side and from end to end so as to cause the fluid to flow back and forth but not sufficient to cause it to run beyond the area over which it was originally spread. The agitation is to be kept up until the reaction has shown up positive or for two minutes before it is given up as being negative. Strong positive reactions will appear within one-half minute but weak ones require more time.

In the presence of positive blood the agglutinin in the blood serum causes the typhoid bacilli to stick together and to collect into a fine or coarse grayish granular sediment visible to the unaided eye. The coarseness of the granules and the rapidity of their formation depend upon the amount of agglutinin present. Rapidly formed coarse granules indicate a very strong reaction. Slowly formed fine granules only indicate a weak reaction. When the fluid remains uniformly cloudy and free from these grayish granules, the reaction is negative.

## THE SUBCUTANEOUS INJECTION OF SMALL QUANTITIES OF HUMAN BLOOD IN SPONTANEOUS HEMORRHAGE OF THE NEWBORN.

BY A. W. MYERS, M.D.,  
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After the question of its effectiveness is settled the practicability of any method of treatment has a considerable influence in determining the extent of its usefulness. This is peculiarly true with regard to some of the therapeutic measures which have been tried in the treatment of the spontaneous hemorrhages of the newborn. The use of gelatin solutions subcutaneously was limited by the difficulty in obtaining a sterile solution promptly. Transfusion in the newborn is an operation quite beyond the ability of the average surgeon. The preparation of human blood serum requires laboratory facilities which are not everywhere available.

The use of horse serum seems open to fewer objections of this character, but the ideal method from this point of view would appear to be that of using untreated human blood subcutaneously. It is with the view of presenting one or two practical points in connection with the method suggested by Schloss and Commiskey that I venture to report the following case:—

Mathilda J., the first child of young and healthy parents, was born at 4 A.M., June 19, 1911. The labor was not complicated nor difficult and an anesthetic was given for only a few minutes. Chloroform was used and less than half a dram was administered. The child appeared to be normal at birth; there was no asphyxia. The birth weight was 5 pounds, 12 ounces. Meconium was passed normally.

At noon on June 20th, when the child was thirty-two hours old, a large stool was expelled, composed entirely of tarry blood clots. This was repeated at 2, 3, 4, 5, 6 and 8 P.M. At 4, 6 and 8 P.M. the expulsion of the bloody stools was accompanied by vomiting of considerable quantities of clotted blood.

During the night the child slept quietly until 4 A.M., when there was a bloody stool with vomiting of blood. This was repeated at 7 A.M., and at 10 and 11:30 A.M. there were bloody stools without vomiting.



When seen for the first time at noon of June 21st the child's condition seemed almost hopeless. The weight had fallen to 4 pounds, 8 ounces; the mucous membranes were very pale. The skin was colorless. The cord was normal, no bleeding occurred at this point, and there were no hemorrhages into the skin or the visible mucous membranes. Three cubic centimeters of blood were drawn from a vein of the mother's arm and quickly injected into the subcutaneous tissues of the baby's buttock before there was time for the blood to coagulate in the syringe. This was done at 12 M.

At 2:30 P.M. a stool was passed containing rather old-looking ing clots and a small amount of fresh blood.

At 4:30 P.M. a second injection of maternal blood was given into the other buttock. This time an attempt was made to obtain a larger amount of blood. Ten cubic centimeters were drawn into the syringe, but it took a little longer to obtain it and a longer time to inject it, the result being that coagulation occurred in the syringe when only 5 cubic centimeters had been injected. But although we feared the amount might be inadequate it proved to be quite sufficient. There was absolutely no more bleeding. The child was put to the breast and nursed well after the first few times. There was no vomiting, and the following stools presented the typical meconium character gradually changing to the milk stool appearance in a few days.

The blood injected was quickly absorbed and a few hours afterward the site of injection could be recognized only by the needle puncture in the skin.

The subsequent history of the child was uneventful. On June 23d, the weight was 4 pounds, 10 ounces; on July 2d, 5 pounds, and on July 16th, 6 pounds.

In a paper published in the *American Journal of Diseases of Children* for April, 1911, Schloss and Commiskey report 7 cases of spontaneous hemorrhage in the newborn treated in this manner, of which 6 recovered and 1 died. They say: "The fatal case was in an infant who had suffered from multiple hemorrhages for eight days and died three and one-half hours after admission to the hospital. The patient was in a moribund condition when admitted and received only a single injection of 10 c.c. of blood."

The amounts of blood they used were somewhat larger than in my case, usually 10 c.c. of blood and sometimes 20 c.c. In the

case I have reported above the attempt to use 10 c.c. of blood resulted in a partial failure on account of its prompt coagulation in the barrel of the syringe. Fortunately, however, the small quantity sufficed.

If it is found that such small quantities of blood as I used will bring about the desired result, the only objection to the method will be removed.

The ease with which this method of treatment can be carried out under any surroundings, and the brilliant results reported by Schloss and Commiskey, will do much to commend it to all who have frequently encountered this alarming condition.

It has been suggested that the spontaneous hemorrhages of the newborn are the expression of a form of chloroform poisoning. On account of the extensive use of chloroform in obstetrics in this part of the world this theory would be rather hard to disprove clinically. In looking over the histories of 9 cases in which this point was covered, I find that all of the mothers had received chloroform, although in some cases the amount given was very small.

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GONORRHEAL VULVOVAGINITIS.—Von Butzke (*Dtsche. med. Woch.*, 1910, No. 32). Vulvovaginitis in children is nearly always due to the gonococcus, rarely to other causes such as uncleanliness, parasites, masturbation, trauma, constipation, etc. The infection in a majority of cases is carried by soiled bedding, by infected sponges or bath water, etc. The onset is rapid. During the first day at the entrance of the vagina there is an insignificant amount of discharge in which no gonococci are found. By the second day the vestibulum is red and swollen, and covered with pus in which many gonococci are to be found. The treatment during the acute stage is rest in bed, a vulvovaginal pad held in place by a T-bandage, Sitz bath, and irrigations with tannic acid solutions. Later on protargol solutions are used, followed by iodoform suppositories of 10 per cent. ichthyol tampons. In obstinate cases a urethritis is commonly present, which is treated with diuretics, mineral waters and antiseptics which are secreted through the urine. In most of these cases there are short periods of abdominal pain and fever, that are best taken care of by rest, a Priessnitz compress and a stopping of all local treatment. A cure is generally accomplished in from six to thirteen weeks; relapses are not observed by the author.

# BACTERIAL COUNTS AND ACIDITY DETERMINATIONS OF THE DIFFERENT GRADES OF MILK AS DELIVERED TO THE CONSUMER, BASED ON A STUDY FOLLOWED FOR ONE YEAR.

BY EDWIN HENRY SCHORER, M.D.,

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Boston, Mass.

Milk as it is now offered for sale in our larger cities is generally graded as certified, inspected, market or pasteurized, according to whether in production, handling and sale, certain conditions have been met with. As a means of determining and controlling particular grades bacteriological counts are given much consideration.

Certified milk is milk obtained from healthy, tuberculin tested animals, well fed and cared for, cleaned before milking, milked carefully and under sanitary conditions by milkers free from disease. This milk must be cooled and bottled soon after it is obtained and always kept cold until delivered to the consumer. The bacterial count per cubic centimeter must be below 10,000. In some places the percentage of butter fat and other chemical constituents are determined upon, while in other cities no attention is given to these. Some certifying commissions demand that the percentage of fat must be stated. Particular details vary. This milk is generally, though not always, licensed by and under the control of a local board appointed by some medical society. Certified milk is designed for feeding of infants, invalids, and for others able and willing to pay the price of such milk.

Inspected milk is also generally obtained from tuberculin tested cattle in healthy condition. Milking, cooling, bottling and all handling must be done under sanitary conditions and the milk kept cold. The number of bacteria per cubic centimeter must not exceed 100,000.

Market milk is milk which in its raw state need not meet the requirements of certified or inspected milk.

Pasteurized milk is any raw milk heated for a period of time to a temperature above 139°F. and below the boiling point.

In more than one-half of our cities of over 100,000 in population, and one-third of those between 50,000 and 100,000 in

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\* Milk research fellowship established and supported by the Milk and Baby Hygiene Association of Boston.

population, there exist bacterial standards for milk. Few cities however have varying standards for different grades of milk.

During the past year in connection with investigational work on milk problems, daily deliveries of twelve different supplies of milk for Boston were received at my laboratory. In the course of the investigations frequent bacterial counts of these milks as delivered were made, and are here recorded in tabulated form showing the average of many counts, the highest and lowest counts observed, as well as other interesting data.

#### CERTIFIED MILK.

Number	Average Count	Highest Count	Lowest Count	Per cent. Over 10,000	Per cent. 5,000-10,000	Per cent. 1,000-5,000	Per cent. less than 1,000	Time of Highest	Time of Lowest
1	3,756	10,500	800	6.	35.	47.	12.	January	November
7	6,650	27,000	1,800	31.	38.	31.	....	November, 1910	August, 1911
8	8,935	24,000	1,400	36.	21.	43.	....	November	May June
9	20,650	51,000	3,500	75.	....	25.	....	November	February June
10	13,900	52,000	900	56.	18.	18.	8.	November	May
11	3,543	14,000	600	7.	15.	57.	21.	March	June
14	3,470	7,100	800	0.	9.	73.	18.	November	August

#### INSPECTED MILK.

Number	Average Count	Highest Count	Lowest Count	Per cent. 50,000-100,000	Per cent. 10,000-50,000	Per cent. 5,000-10,000	Per cent. 1,000-5,000	Per cent. less than 1,000	Time of Highest	Time of Lowest
4	33,610	52,000	12,500	8.	92.0	....	....	....	November	March
12	11,545	99,000	1,300	21.0	28.0	23.0	28.	....	June	March

#### PASTEURIZED MARKET MILK.

Number	Average Count	Highest Count	Lowest Count	Per cent. over 1,000,000	Per cent. 500,000-1,000,000	Per cent. 50,000-500,000	Per cent. 10,000-50,000	Per cent. 5,000-10,000	Per cent. 1,000-5,000	Per cent. Below 1,000	Time of Highest	Time of Lowest
2	310,250	840,000	6,000	..	40.0	27.0	20.0	13.0	..	..	August	November
3	285,875	1,640,000	16,000	..	51.0	31.0	16.0	..	..	..	February	November
13	916,333	1,560,000	4,000	..	31.0	46.0	8.0	15.0	..	..	March	December
41	4,020	97.0	200	..	..	..	0.0	30.0	40.0	30.0	July	May



It is to be remembered that these bacterial counts were made upon delivery at the laboratory, and therefore give information only in regard to the uniformity or variability in bacterial counts of the various grades of milk as they are offered for sale. From the tables it is evident that some producers of certified milk have great difficulty in keeping under the maximum bacterial count permitted. When however a producer of certified milk has properly adjusted conditions he can produce milk of low count rather consistently. Inspected milk of a uniform high grade was delivered by one large dairy. The other inspected milk although of very high grade generally at times contained large numbers of bacteria. Three of the pasteurized milk supplies varied a great deal, while the fourth furnished milk consistently that contained less than 10,000 bacteria per cubic centimeter. It is to be noted from the tables that pasteurized market milk of low bacterial count can be furnished by all the dealers from whom I received daily deliveries. Pasteurization in every case was accomplished by holding from twenty to thirty minutes at the pasteurizing temperature, Nos. 2, 3, 13 being pasteurized before bottling and No. 4 after bottling.

The time of the year when the highest counts occur varies; the better milks generally have highest counts in the fall and winter, especially is this true of the certified milks, while the general market milk is likely to be highest in the spring or summer. Investigation on the causes of the higher counts in certified milks during the fall seems to indicate that the necessity for carrying milk to the distant milk-house, through the cold air, makes the milkers dislike to wash their hands frequently, and that winter weather generally interferes with the rigid technique of certified farms. The higher counts in market milks during the summer are probably due to more pressing work on the farm, dust, and multiplication of bacteria as a result of poor refrigeration, especially in the spring when winter methods are no longer efficient and summer refrigeration has not yet been started.

*Acidity* of milk is generally regarded as being of considerable importance in determining the age of milk. Fresh milks however vary a great deal as is evident from the table showing the average of a large number of determinations of milk as delivered. The table also shows the highest and lowest degrees of acidity\* noted during the year's observations.

\* Degrees of acidity equal numbers of cubic centimeters of  $\frac{N}{4}$ NaOH to neutralize 100 cubic centimeters of milk, with phenolphthalein as an indicator. The degrees of acidity can be changed to percentage of lactic acid by multiplying by 0.0225: thus 6° equals 0.1350 per cent. of lactic acid.

No.	Certified.							Inspected.		Pasteurized.			
	1	7	8	9	10	11	14	4	12	2	3	13	41
Average Acidity	6.006	5.93	5.95	6.26	6.38	6.37	6.6	6.23	6.41	5.69	5.97	6.36	6.08
Maximum Acidity	7.0	7.0	7.0	7.4	7.6	8.0	7.2	8.0	6.8	8.0	7.6	8.2	6.2
Minimum Acidity	4.8	5.2	4.4	5.6	5.2	5.2	6.0	5.2	6.0	4.0	5.2	5.2	6.0

Total averages: certified = 6.18; inspected = 6.306; pasteurized = 5.96.

Based on observations both at the places of production and distribution and on the relatively small numbers of bacteria found at times in all of the milk supplies examined during the year, it is evident that it is comparatively easy generally to produce milk of low bacterial count, but that the greatest care must be constantly exercised to prevent occasional high counts even in certified milk. While certifying boards must certainly consider such occasional increases in bacterial content, revocation of the license to certify is apparently warranted only when proper conditions are not obtainable either through refusal to comply with suggestions or through incompetency. If certifying commissions will take this into consideration the supply of certified milk will be much increased. As conditions are at present a considerable part of milk of the certified grade is not certified because producers of such milk are unwilling to risk the reputation of their milk without being given a fair chance to rectify errors leading to counts above 10,000 bacteria per cubic centimeter. A supply composed of the product of a considerable number of good producers is more constant because of dilution. After all bacterial counts are only circumstantial evidence and milk with the lowest counts may at times be the means of disseminating a communicable disease.

KOPLIK'S SPOTS.—Mme. de Biehler finds that in measles these spots *always* precede the rash and are absolutely characteristic of measles. In 946 cases the spots appeared in 864 cases one day, in 42 cases, two days; in 18 cases, three days, and in 12 cases four days before the rash. Search for Koplik's spots is important in all acute diseases of infants, particularly for its prophylactic value.—*Medical Record.*

## EDEMA IN INFANTS.\*

BY PALMER A. POTTER, B.S., M.D.,  
East Orange, N. J.

In the *Medical News* of 1904, I published a study of 7 cases of edema in babies, most of them occurring during the course of a more or less severe diarrhea. Since then, I have by no means lost interest in the subject, and have been able to observe 17 cases of this condition, a brief description of which, with a theory as to their possible etiology and significance, I am taking the liberty of bringing to your attention at this time.

This condition, *i.e.*, edema, either localized or much more rarely general in its distribution, is infrequently met with, and when met with, is, I believe, especially in the slighter forms, seldom recognized for what it is. If recognized, but little significance is attached to it.

It may be that what we are looking for we always find, but true it is that in the past four years I have seen 17 cases of dropsy in young infants, not of cardiac or renal origin, whereas others who see many babies have seen, or at least noted, but few instances of this condition.

For it is a condition, and not a disease *per se*, and, in my belief, a condition with special significance, and with special indications for a certain and particular line of treatment.

All of the cases I have noted have occurred in children suffering from extreme malnutrition, or even marasmus, the great majority with an intercurrent diarrhea.

A typical history of a case showing this condition is that of a young baby with extreme malnutrition that suddenly develops a diarrhea. Because of the diarrhea, the diet is changed to boiled water, barley water or perhaps whey. After an interval of several days, during which, of course, the baby progressively loses weight, with the intestinal condition perhaps showing some improvement, but not enough to warrant any marked increase in the solid constituents of the diet, on one certain day a gain of several ounces may be noted at the daily weighing followed usually the next day by an additional gain.

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\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Spring Lake, New Jersey.



I speak of daily weighing, for I believe that a child with malnutrition, sufficiently severe to be sent to the hospital, has only one way of having its change of condition, either for better or for worse, recognized, and that is by a daily weighing, taken at the same time each day and always under the same conditions. I do not think that the time has come in pediatrics to throw away the scales nor that the wiry baby is the healthy baby.

If the cause of this progressive gain, in this particular typical case, be sought for, we are, first of all, confronted by the fact that the baby has been and still is on a diet of cereal water, or at most, a heavily diluted whey. The bowel movements in practically all the cases I have seen have continued abnormal, both as to frequency and character.

A close examination of the baby will disclose what is practically always the first sign of this condition. The soles of the feet will be red and rounded, instead of flat, and, if it has progressed for several days, the arch of the foot will be entirely lost. The redness is usually the first sign and may be noted even before the loss of normal contour can be detected.

A certain proportion of the cases, particularly under the treatment shortly to be suggested, show no extension of the edema above the feet, and, if the baby lives, the swelling may gradually disappear with a corresponding loss of the suddenly gained weight.

If, however, the edema continues and spreads, the next place where it may be noted is usually on the face, under the eyes, and not, as might be expected, on the legs.

Previous to the adoption of the procedure shortly to be described the edema practically always spread rapidly over the face and extremities until the skin over these parts was tense, shiny and swollen, and would pit deeply on pressure. In many cases, the babies, even those of from 4 to 5 pounds in weight, would gain within two or three days from  $\frac{1}{2}$  to 1 pound, due entirely to the dropsy.

In none of the 17 instances, the observation of which has prompted the writing of this article, was there any involvement of the serous cavities, although a case observed in 1902 in the Nursery and Child's Hospital, and described in a previous paper, had a general anasarca with fluid in the abdomen and chest.

As to the outcome in this supposed typical case, my experience has been that if the usual methods of treating intestinal



disturbances are pursued—in other words, if the baby is still kept on a weak food, or on no food at all, the almost invariable and almost immediate outcome is death. Not death from the edema, for edema is merely a symptom, or rather, to my mind an indication, but death from inanition, marasmus, malnutrition, strip pneumonia or whatever we may say the children die from who are unable to have given them an approximately appropriate food.

The dropsy in these cases is *not* due to any involvement of the kidneys nor of the heart, nor is it due to back pressure from the liver, nor to any abnormal condition of the blood that could be detected. I shall not go into the details of the examination of each case observed, as I did in my previous article on the subject. Suffice it to say that the clinical and laboratory examinations were carefully made, as 13 of the cases were observed in the children's wards of the Orange Memorial Hospital. Eight of the 13 cases seen in the hospital occurred within the same two months' service. This fact might create the supposition of there being something infectious or communicable in the condition, or of its being a manifestation of some particular disease, were it not for the fact that the other cases were found at wide intervals, with no possible relation between one case and any of the others.

At the time the 8 cases appeared within the eight weeks at the hospital, a rather more reasonable theory as to the causation was advanced by some others who had observed and wondered at the repetition of the same condition. They declared it due to the barley water, which the children, because of the diarrhea on entrance, had been given. This may be dismissed by the fact that it occurred four times in children on whey, in 2 cases with a weak addition of milk, and once in a child on a malt soup with a slight milk addition.

It is not what the babies are being fed that causes the dropsy; but what they are *not* being fed. In other words, I believe it is entirely owing to the fact that they are not getting enough proteids in the diet, and this notwithstanding the intestinal disturbances that practically always accompanies or precedes the edema. It may be that in many of these cases the continuance of the diarrhea itself is due to the deprivation of solids in the food.

In all cases of intestinal disturbance of such character as to necessitate the curtailment of food or the prohibition of some of the food elements, it is always a difficult question to decide when

to increase the amount, if curtailment has been the means used, or to resume the elements where some have been withdrawn; and it is unquestionably the fact that we often keep up the curtailment or the deprivation of some of the food elements for a longer period than is necessary. And I believe that the edema is an indication as to when increased feeding or resumption of prohibited elements is called for, especially of the proteids.

I have come to this conclusion because up to 1904, at which time the practice of resuming or increasing proteids in the diet was begun, nearly all the babies showing this condition died, and the symptom was considered an antemortem sign. Since then the routine increase of the proteids in the diet has resulted in the recovery of a large and definite proportion of the cases showing edema. A recovery not only from the edema but an improvement also in the general condition.

May we not have, in this somewhat rare phenomenon, one of our few definite means of determining that the prolongation of intestinal disturbance is due to the over-long administration of a diet low in fats and proteids?

26 Halstead Street, East Orange, N. J.

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AT WHAT AGE SHOULD THE EDUCATION OF THE DEAF CHILD COMMENCE?—By Macleod Yearsley (*The British Journal of Children's Diseases*, October, 1910). The author believes that the instruction of the deaf child should commence at the age of three years, and that the ultimate success of deaf education would be greatly enhanced thereby. He bases his opinion on the fact that it is the formative period of child life. At three years of age the brain and larynx are more plastic than they are later, the speech and visual centers may be stimulated to greater development, and advantage is taken of the hereditary tendency to talk. By beginning to teach these children to talk at the third year they more nearly approach the normal child than if the teaching is delayed until the seventh year, according to his personal experience.

## MINERAL SALTS AND THEIR RELATION TO THE DIETARY OF INFANTS AND YOUNG CHILDREN.

BY B. RAYMOND HOOBLER, A.M., M.D.,

New York City.

During the past few years much work has been done in determining the relation which the mineral salts bear to metabolism problems of infants and young children. In a recent article\* the writer reviewed the literature on this subject and added the results of his own findings in a healthy nine months old infant fed on cow's milk.

Many practical problems have grown out of this work, and one which has particularly emphasized itself is that which is concerned with the therapeutic use of the mineral salts, particularly in young children.

When a condition of deranged mineral salt metabolism has been established which has expressed itself in diseased conditions such as tetany, rachitis, osteomalacia, anemia and various nutritional disturbances, what is the pediatricist to do to correct it?

It has been shown in many researches that the various minerals when given in the form of their inorganic salts, either are not at all available, or are only so to a slight degree. For example, Cronheim and Miller† have shown that the absorption of phosphorus is not in the least affected by the presence or absence of the inorganic phosphates, but that, on the other hand, phosphorus absorption may be greatly increased when the child is fed on egg yolk which is rich in organically bound phosphorus. Sal-kowski has shown that the organism has not the power to build from phosphorus-free albumin or from inorganic phosphates, cells which require as an integral part, organically bound phosphorus. In other words, one may flood the intestinal canal with inorganic phosphates, but they will in no measure supply the need of the nerve cells for phosphorus.

It is therefore important that the mineral salts come to the growing infant or young child in the form in which they may be utilized in the building of tissues. Nature's way, namely through the various food products, seems therefore much the

\* *American Journal of Diseases of Children*, 1911, Vol. II., pp. 107-140.

† Cronheim and Müller, *Ztschr. f. Diät. u. Physik. Therap.*, 1903, Vol. VI.

better way, and it is with this in mind that the writer has gathered and arranged in order of richness of various mineral salt content the different foods which may be used in the nourishment of infants and young children.

The articles in the following lists are arranged according to their richness in mineral salt as per the headings. Take, for example, fruits under phosphorus; the various fruits are named in the order of their phosphorus content, in terms of  $P_2O_5$ , the mineral ash of such fruits varying from 15 per cent. to 12 per cent. of  $P_2O_5$ .

Each list contains only such articles as are relatively high in content of their respective mineral. The lists are by no means complete, but contain sufficient variety to afford a choice from day to day. It is not intended that the diet be restricted to those articles named, but, wherever possible, the day's caloric need should contain certain of the foods rich in the desired mineral.

#### PHOSPHORUS-CONTAINING FOODS.

##### Contents Estimated at $P_2O_5$ .

##### FRUITS.

15%-12%.

Pears, apples, citron, cherries, plums, apricots, oranges, figs.

##### BERRIES.

20%-13%.

Gooseberries, currants, huckleberries, strawberries.

##### NUTS.

43%-18%.

Almonds, cocoanuts, chestnuts.

##### CEREALS.

54%-17%.

Rice flour, rice, wheat flour, buckwheat flour, oatmeal, oatmeal flour, barley meal, barley flour, rye flour, cornmeal, cornmeal flour, rolled oats, pearl barley, macaroni, brown bread, white bread.

##### VEGETABLES.

41%-10%.

Black radishes, artichokes, beans, peas, lentils, pumpkins, kohlrabi, cauliflower, asparagus, potato, cabbage, savoy cabbage, mushrooms, onions, rhubarb, cucumbers, turnips, celery, carrots, sugar beets, radishes, spinach.



## MILK, EGGS, CHEESE.

65%-26%. Egg yolk, eggs, cheese, milk.

## MEATS AND FISH.

48%-20%. Veal, pickerel, pork, beef, oysters, salmon.

## POTASSIUM-CONTAINING FOODS.

Content Estimated as  $K_2O$ .

## FRUITS.

81%-35%. Olives, plums, apricots, figs, pears, cherries, pineapples, citron, oranges, apples.

## BERRIES.

57%-21%. Huckleberries, currants, gooseberries, strawberries.

## NUTS.

56%-28%. Chestnuts, cocoanuts, walnuts, almonds.

## CEREALS.

38%-14%. Rye flour, wheat flour, cracked wheat, rolled oats, cornmeal, cornmeal flour, hominy, barley flour, barley meal, oatmeal, buckwheat flour, oatmeal flour, rice flour, graham bread.

## VEGETABLES.

60%-16%. Potatoes, rhubarb, cucumbers, mushrooms, cabbage, turnips, celery, beans, peas, tomatoes, endive, lettuce, carrots, kohlrabi, lentils, radishes, Savoy cabbage, onions, artichokes, asparagus, cauliflower, pumpkins, blood beets, spinach.

## MILK, EGGS, CHEESE.

31%-13%. Egg whites, milk, eggs, cheese.

## MEATS AND FISH.

48%-24%. Beef, pork, veal, salmon, pickerel.

## SODIUM-CONTAINING FOODS.

Content Estimated as  $Na_2O$ .

## \* FRUITS.

26%-7%. Apples, oranges, apricots, pineapples, pears, olives.

## BERRIES.

28%-9%. Strawberries, gooseberries.

## CEREALS.

40%-14%.      Macaroni, barley flour, brown bread, white bread, graham bread.

## VEGETABLES.

48%-7%      Blood beets, spinach, carrots, pumpkin, radishes, asparagus, tomatoes, lentils, endive, cauliflower, turnips, sugar beets, artichokes, lettuce, Savoy cabbage.

## MILK, EGGS, CHEESE.

31%-8%      Egg whites, eggs, milk.

## MEATS AND FISH.

30%-8%      Oysters, pickerel, salmon.

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IRON-CONTAINING FOODS.

Contents Estimated as  $\text{Fe}_2\text{O}_3$ .

## FRUITS.

2%-1%.      Figs, pineapples, apples, pears, plums.

## BERRIES.

5%-1%.      Strawberries, gooseberries, huckleberries.

## NUTS.

1.8%-1.3%.      Cocoanuts, walnuts.

## CEREALS.

2%-1%.      Rye flour, barley meal, barley flour, rice, buckwheat flour, cornmeal, corn flour, rice flour, wheat, wheat flour, graham flour.

## VEGETABLES.

5.3%-1%.      Lettuce, onions, asparagus, spinach, endive, kohlrabi, pumpkins, artichokes, tomatoes, lentils, black radishes, celery, rhubarb, potatoes, mushrooms, beets.

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SULPHUR-CONTAINING FOODS.

Content Estimated as  $\text{SO}_3$

## FRUITS.

6%.      Apples, pears.

## BERRIES.

6%.      Gooseberries.

## CEREALS.

14%-13%.      White bread, brown bread.

## VEGETABLES.

30%-5%.

Black radishes, mushrooms, cauliflower, turnips, kohlrabi, cabbage, spinach, carrots, cucumbers, potatoes, asparagus, onions, celery, endive, artichokes.

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## CHLORINE-CONTAINING FOODS.

Content Estimated as Cl.

## FRUITS.

10%.

Pineapples.

## NUTS.

14%.

Cocoanuts.

## CEREALS.

30%-5%.

White bread, brown bread, macaroni, oatmeal.

## VEGETABLES.

16%-5%.

Celery, potatoes, cucumbers, radishes, savoy cabbage, lettuce, asparagus, tomatoes, cabbage, spinach, beets, rhubarb, turnips, kohlrabi, carrots.

## MILK, EGGS, CHEESE.

28%-7%.

Egg whites, milk, eggs, cheese.

## MEATS AND FISH.

21%-5%.

Salmon, oysters, pickerel.

## MAGNESIUM-CONTAINING FOODS.

Contents Estimated as MgO.

## FRUITS.

8%-5%.

Apples, pineapples, oranges, figs, pears, citron, cherries, plums.

## BERRIES.

6%-5%.

Currants, huckleberries, gooseberries.

## NUTS.

18%-6%.

Almonds, walnuts, chestnuts, cocoanuts.

## VEGETABLES.

9%-5%.

Tomatoes, sugar beets, peas, cauliflower, kohlrabi, lettuce, spinach, celery, carrots, onions.

## CEREALS.

16%-5%.

Corn, cornmeal, wheat, wheat flour, barley meal, buckwheat, rice, rice flour, rye flour, oatmeal, rolled oats, graham bread.

## MEATS AND FISH.

9%-5%.

Salmon, pork.

## CALCIUM-CONTAINING FOODS.

Contents Estimated as CaO.

## FRUITS.

30%-7%.

Citron, oranges, pineapples, figs, pears, cherries, olives.

## BERRIES.

14%-8%.

Strawberries, gooseberries, currants, huckleberries.

## NUTS.

9%-8%.

Almonds, walnuts.

## CEREALS.

8%-7%.

Oatmeal, cornmeal, wheat flour.

## VEGETABLES.

27%-5%.

Savoy cabbage, cauliflower, onions, lettuce, radishes, celery, cabbage, endives, spinach, asparagus, carrots, kohlrabi, turnips, rhubarb, artichokes, pumpkin, lentils, cucumbers, tomatoes, beans.

## MILK, EGGS, CHEESE.

35%-8%.

Cheese, milk, egg yolks, eggs.

## MEAT AND FISH.

18%-7%.

Oysters, salmon, pickerel, pork.

The use of the diet list is simple. For example take the problem of phosphorus therapy. From the list, can be chosen such articles as are rich in phosphorus and by various alterations through the diet phosphorus can be supplied in organic combination with other food stuffs in considerable quantities and in proper form for its absorption and utilization. Of course this is applicable only to the therapy of those diseases in which there is a known phosphorus deficiency. In cases not so clearly defined it is first necessary to determine by a study of the intake



and output of the various minerals which one is responsible for the condition existing.

But recently a case was referred to the author which was suspected of having a deranged calcium and phosphorus metabolism. The child was put on a definite diet, the intake and output of minerals studied, the deficiency found and under influence of diet containing the deficient minerals and suitable medication the patient rapidly improved.

Another case, that of a young child three years of age, very anemic and poorly nourished, came under the writer's observation. It was learned that the major part of the child's caloric need was being supplied by cow's milk and had been from infancy. To combat the anemia iron preparations had been given with the usual constipating result. Milk being very poor in iron content, a radical change in diet was made. Child was fed largely on such foods as are named in the iron list. All medication by the various iron preparations was stopped. The child was immediately sent to the country and soon rosy cheeks replaced the pale and sunken ones. The anemia disappeared, the child increased in weight and there was no further constipation.

In arranging the various lists I have drawn freely on the work done by the United States Department of Agriculture, Bureau of Chemistry, to the bulletins of which Bureau those desiring exact figures are referred. I have also used many of the analyses reported by Albu and Neuberg published in their "Physiologie und Pathologie des Mineralstoff-wechsel," Berlin, 1906.

It should be kept in mind that the analysis of the various vegetables and fruits differ when grown in different parts of this country and even in the same part of the country dependent upon the soil. Also that the analysis of land products differs very much whether grown in this country or abroad.

*131 East 67th Street.*

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USE OF CALCIUM SALTS AGAINST SERUM SICKNESS.—M. A. Cassidy (*Lancet*, December 16, 1911) finds that, in cases treated with diphtheria antitoxin, the administration of calcium salts for the purpose of preventing or mitigating antitoxin rashes has been found by actual trial to favor the occurrence and duration of these rashes.—*Medical Record*.

## SOCIETY REPORTS.

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### THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

*Stated Meeting, Held February 8, 1912.*

WILLIAM SHANNON, M.D., CHAIRMAN.

#### A CASE OF SECONDARY ANEMIA.

DR. CHARLES HERMANN presented this patient, a baby, two years of age. The family history was negative and the parents had one other child, who was healthy. The patient had had pertussis and some digestive disturbance. At the age of eighteen months the child was brought to the Babies' Hospital because of some enlargement of the abdomen. When the child was admitted to the hospital, in July, 1911, he had marked anemia, the spleen was six inches below the costal margin in the axillary line and the liver one and one-half inches below the costal margin in the mammary line. The blood examination at this time showed hemoglobin, 40 per cent.; red blood corpuscles, 2,800,000; white blood corpuscles, 13,000. Thirty nucleated red cells were found in 300 counted. Examination of the blood two months later showed hemoglobin, 30 per cent.; red blood corpuscles, 2,544,000; nucleated red cells, 55 in 300. From this time the patient began to improve and was discharged in December. At this time the spleen was only three and one-half inches below the costal margin; the hemoglobin was 70 per cent.; red blood corpuscles, 5,280,000, and only an occasional nucleated red corpuscle was found.

This disease is usually considered a form of secondary anemia, and it is sometimes difficult to determine the primary cause when syphilis, tuberculosis and chronic indigestion are absent. On the other hand, many cases of these infections are not accompanied by these blood changes. On a previous occasion he had suggested that there might be a congenital defect in the blood-forming organs, as a certain number of these cases give a history of anemia from birth. Infants are born with a certain amount of reserve iron in the liver, and in case of premature infants or twins this amount would probably be less than normal,

and after a few months of exclusive milk diet would be exhausted. Sometimes, under normal conditions, the blood-forming organs might be able to meet the demands, but if an intercurrent disease attacked the child, they might not be able to do so; this would explain why this condition occurred after certain constitutional diseases.

#### A CASE OF SPLENOMEGALY.

DR. CHARLES HERMANN presented another case, a boy, twelve years of age, whose parents were healthy and who had eight brothers and sisters, all living and healthy, except one that died of convulsions in infancy. The patient had had measles and pertussis, but no manifestations of syphilis, and had never had chills and fever. He first came under observation in 1906 at the age of seven years. The enlargement of the abdomen had existed, according to his mother's statement, since he was four years old. He had had abdominal pain for the last six months and epistaxis three or four months ago. Dr. James had diagnosed his condition as splenic anemia. Examination of the blood showed hemoglobin, 75 per cent.; red blood corpuscles, 4,390,000; white blood corpuscles, 4,000; polymorphonuclears, 70 per cent.; lymphocytes, 29 per cent.; eosinophiles, 1 per cent. The spleen extended one-half inch beyond the middle line and three inches below the level of the umbilicus. The liver extended two inches below the costal margin in the mammary line.

The cervical, axillary and inguinal nodes were palpable, but not distinctly enlarged. Blood examinations made at various times during the past five years showed that the hemoglobin varied from 30 to 75 per cent.; the red blood cells from 2,560,000 to 4,600,000; the white blood cells from 2,400 to 6,800; the polymorphonuclears from 51 to 70 per cent.; the leukocytes from 29 to 48 per cent. At present the condition was about midway between these extremes. There were no abnormal changes in the shape or size of the cells, and the Wasserman and von Pirquet reactions were negative. In June, 1909, the boy had a tooth pulled, which was followed by oozing from the gums, and the following month he had had abdominal pain and had vomited a large amount of blood. There had been no marked changes in the condition of the patient during the past five years. Three conditions might be considered as possible in this case; splenic anemia, Banti's disease, or the primary splenomegaly of Gaucher.

At present the patient weighed 66 pounds. The absence of ascites could not be positively against Banti's disease, as it was characteristic of only the third stage of that disease. The fact that the urine was normal and the liver large so early in the course of the disease would be rather unusual. The fact that this was the only case in the family militated against a diagnosis of primary splenomegaly. Hemorrhage was very unusual in this condition. After having observed the patient for five years, he was of the opinion that the original diagnosis of splenic anemia was the correct one. Mercury, quinin, arsenic and X-ray treatment had been employed without producing any noticeable change in the patient's condition. If he became worse, removal of the spleen might be advisable, as a certain number of cases showed marked improvement after this operation.

DR. NATHAN E. BRILL confined his remarks to the second case. He said the whole subject of enlargement of the spleen and liver was involved in obscurity, and this was especially true when these enlargements existed independently of known constitutional infections, and independently of that peculiar disease, leukemia. This patient appeared to him to present a clinical entity to the possibility of diagnosing, which he had called attention and to which he had given the name of its discoverer—Gaucher. This boy was, in his opinion, suffering from the Gaucher type of primary splenomegaly. The pathology of this condition was unique, the spleen, the liver, the portal system, the lymph glands and the bone marrow undergoing a peculiar endothelial transformation. The proliferating endothelium showed cells, whose appearances were characteristic and, so far as he knew, not imitated by any other disease of those organs. The points that differentiated this disease from splenic anemia and Banti's disease were: the longer duration of the disease in the Gaucher type, the unpronounced anemia of the simple chlorotic type, which became marked only toward the end of the patient's life, whereas it was an early and marked feature in splenic anemia; the peculiar and definite pigmentation of those parts of the skin that were exposed, a peculiar bronze color of the face, neck and hands; the entire absence of jaundice and ascites; the remarkable feeling of comfort that these patients experienced, though the spleen and liver might reach a colossal size. The liver was much larger in Gaucher's disease than in splenic ane-



mia and the presence of wedge-shaped conjunctival thickenings on one or both sides of the eye with the bases toward the cornea and the angles extending toward the nasal or temporal angles of the lids had been observed in every case of Gaucher's disease that he had seen, and his observations had included a larger series than that of any other observer. Clinically, the disease appeared in two forms—one affecting more than one member of a family, and the other in which only a single member of a family developed it. Of 13 cases reported up to 1908, Dr. Brill had furnished 4, and in these the diagnosis had been made and reported during the lifetime of the patients and was later confirmed by autopsy. Since that time he had seen 2 other cases—one in which only one member of the family was affected, and one in which there was a second case in the same family. In this disease the blood picture was that of a simple, mild anemia of the chlorotic type, but showing a decided leukopenia. Late in the disease hemorrhages might occur from the nose, gums, stomach and intestines, as well as ecchymoses on very slight injury to the skin. The progress of the disease was much slower than in any form of splenic anemia. He had a patient who had had the disease since her nineteenth year, and she was now forty-six, and swam and played tennis, though the spleen and liver filled the abdomen almost completely. Dr. Hermann's patient had a tremendously enlarged spleen, an almost equally enlarged liver, the wedge-shaped conjunctival thickenings, the peculiar bronzing of the skin of the face, neck and hands, while that of the body was normal, though a trifle pale. If his urine was examined, no bile would be found, though occasionally in these cases there might be some pathological urobilin of Jaffe. The blood serum would show an absence of bile. From the above statements it was evident that he could not agree with the diagnosis of the gentleman who presented the case, but felt convinced that the patient was suffering from Gaucher's disease.

DR. CHARLES HERMANN, in closing the discussion, said that it did not seem possible in his case to make a positive diagnosis of primary splenomegaly from the clinical manifestations. The blood findings were not characteristic, and the slight pigmentation on the nose was not pathognomonic. Severe hemorrhage from the stomach had not been reported in any of the undoubted cases of primary splenomegaly of the Gaucher type.

AN UNUSUAL CASE.

DR. CHARLES GILMORE KERLEY reported the case of a child, six years of age, who swallowed a watch. An X-ray picture showed the watch lodged in the esophagus, from which he had fished it out with a bent wire.

A CASE OF FOOD ALLERGY; IDIOSYNCRASY TO EGGS, ALMONDS AND OATS, DUE TO ANAPHYLAXIS.

DR. OSCAR M. SCHLOSS read this paper, which was based on his observations of a patient who was now eight years of age. The child's first experience with an egg was when at the age of ten days he was given the white of an egg in barley water during an attack of diarrhea. There seemed to be no ill effects at that time. When fourteen months of age, after having eaten a few mouthfuls of boiled egg, he began to cry and to claw his mouth. The tongue, lips and buccal tissues began to swell and large urticarial wheals appeared about the mouth. If the child played with egg shells they produced urticaria on the hands and arms. These same symptoms invariably followed the administration of egg, no matter in what way it was taken, being noticeable even after he ate cake or roll glazed with egg. Two years ago he was given almond for the first time and the same symptoms followed as after the ingestion of egg. He had eaten other kinds of nuts without ill effects. Oatmeal also caused symptoms similar to those produced by egg. The problems for investigation in this case were indicated by the history. It seemed of interest to determine the constituents of the foods which were responsible for the toxic symptoms. It was found that cutaneous inoculation of the active substances produced a distinct urticarial wheal at the site of the inoculation which appeared in from five to fifteen minutes after the test was made. In stronger dilutions the active substance produced typical urticarial wheals by mere contact with the unbroken skin. The reaction was always immediate and always disappeared within one-half to one hour. Numerous control experiments were made to show that the reaction was specific and could not occur from chemical or mechanical irritation alone. Experiments with egg, almond and oatmeal showed that the reaction was produced by the protein constituent only and that extracts and preparations free from protein were entirely inert. Experiments also showed that protein from the same source varied in activity. Obviously the

patient's idiosyncrasy, his hypersusceptibility to the food protein, was due to one of two causes—either he lacked some protective substance present in normal individuals, or he was sensitized in the same manner as an animal became sensitized when given a single injection of a foreign protein. A number of experiments failed to demonstrate a lack of protective substance. That the condition was due to protein sensitization was shown by the fact that it was possible to sensitize guinea pigs passively by means of the patient's blood serum. Control animals developed no symptoms whatever when given the same amount of inactivated normal blood serum followed by the same amount of ovomucoid. The next problem was that of immunization. It seemed advisable to use a single protein for this purpose, as by this mean it could be ascertained whether the patient's hypersusceptibility to the three dissimilar foods was in any way related. Ovomucoid was chosen as the protein for immunization and treatment was begun by the administration of 2 mg. of ovomucoid in capsules three times a day. The dose was increased very gradually at first and then more rapidly, and the progress of immunization was determined by the cutaneous reaction. In a little over a month the patient was taking 100 mg. of ovomucoid daily and the reaction began to decrease and was induced only by comparatively strong dilutions, 1-500, or stronger. At the end of two and one-half months' treatment the patient could eat one-sixth of an egg with no ill effects. From this time egg was given in small quantities daily. The proteose from oats caused no reaction in dilutions as high as 1-100 and oatmeal had been eaten a number of times with no resulting symptoms. These results seemed to indicate that the idiosyncrasy to the three foods was in some way related. During the treatment the patient was in comparatively good health and there were no symptoms referable to the administration of the ovomucoid.

DR. HENRY KOPLIK said that there was no doubt but that many children showed an idiosyncrasy to eggs, and they should be very cautious when giving eggs to infants under one year of age for the first time. Sometimes the clinician thought to overcome this idiosyncrasy by feeding the egg in some other food, but the same result followed almost invariably. In exceptional cases milk also was badly borne. Dr. Koplik said that he had at present patients who could not tolerate milk. He knew of two



children in the same family who could not touch milk, and one was brought up practically without milk. These children did not show the same symptoms when given mother's milk. Dr. Schloss's von Pirquet method was interesting, and if his observations were confirmed they might lead to important results in the feeding of these children. The paper also served as a warning not to force children to take foods that actually disagreed with them.

DR. CHARLES GILMORE KERLEY said that there were many children who could not partake of milk or eggs because of some special intolerance for them. In his own experience, it was the milk that gave the more trouble. Only two months ago he saw a fatal case in consultation. The mother wished to wean the infant. All the cow's milk that was given during the first twenty-four hours was vomited. Finally, two ounces of it was retained until ten o'clock in the morning, when the baby went into collapse and shock, becoming for the time almost pulseless, gradually became weaker and died fourteen hours after the milk that was retained had been given. Dr. Kerley called attention to the fact that idiosyncrasies existed for other substances than food proteins.

DR. ROWLAND G. FREEMAN said that it was not generally understood how many infants were susceptible to eggs; he believed that about one-tenth of all babies showed some susceptibility to eggs. He had seen a case in which rise of temperature, general urticaria and edema of the ears, lips and vulva followed within three hours after the child had been fed egg. Evacuation of the alimentary tract caused these symptoms to disappear as quickly as they had come on. Only a small amount of white of egg should be given at first in order to ascertain if the child was susceptible to egg poisoning.

DR. FLOYD M. CRANDALL said that he had noticed this idiosyncrasy to cow's milk in children, and he cited an instance of two children in the same family who could not take cow's milk without becoming very sick. Both, however, could take breast milk, and were nourished by a wet-nurse.

DR. OSCAR M. SCHLOSS said that the cutaneous reaction was not always obtained in these cases. At present he was observing 2 cases of idiosyncrasy to eggs, manifested by gastrointestinal



disturbances, in which there was no cutaneous reaction. In a case of hypersusceptibility to pork that had come under his observation, a cutaneous test was negative, but subcutaneous injection of pig's blood serum produced both a local and a general reaction. So far as was known at present, anaphylaxis was due essentially to protein substances; whether drug idiosyncrasies were due to the same or related condition was a subject for investigation.

ALBUMIN MILK: ITS VALUE AND INDICATIONS IN THE TREATMENT OF THE DIARRHEAS OF CHILDREN.

DR. HENRY HEIMAN said that a survey of the voluminous literature on the diarrheas of children showed how little of lasting value had been accomplished in this field of therapeutics. The method of treating these affections by catharsis, starvation and the use of intestinal astringents in some cases brought about such a reduction in the resistance of the child that it readily succumbed to any intercurrent infection. There was urgent need of a method of treatment which would conserve the strength of the patient and at the same time ameliorate the intestinal condition. Finkelstein and Meyer had given the hope that such a method of treatment had been found. Their studies on the alimentary factors concerned with the production of intestinal fermentation showed the predominant rôle played by the carbohydrates and the salts. A diminution of intestinal fermentation was invariably noted on the decrease or removal of one or both of these elements. Their studies further yielded the fact that casein had a pronounced antagonistic action upon carbohydrate fermentation in the intestines. They showed that when casein was present, larger amounts of carbohydrates could be given without producing fermentation. A comparison of the "Eiweiss milk" of Finkelstein and Meyer showed the following:—

	Eiweiss Milk.	Cow's Milk.
Proteids .....	3.00	3.00
Fats .....	2.50	3.50
Carbohydrates .....	1.50	4.50
Ash .....	0.50	0.70

There were 370 calories of a liter of eiweiss milk. The results that Finkelstein and Meyer obtained by the use of this milk were so satisfactory that it had been adopted in many German

clinics. The writer had first used it in the latter part of the summer of 1910 and had continued to use it during the summer of 1911. All patients admitted to Dr. Koplik's service at the Mount Sinai Hospital suffering from diarrhea were given albumin milk for a period varying from three to ten days. The series of cases was thus an unselected one. In the preparation of the milk they had followed very closely the method of Finkelstein and Meyer. A tablespoonful of Simon's essence of rennet (or two tablets of rennet) were added to one liter of milk. This was placed in a water bath at a temperature of 42 C. for one-half hour. The milk was then filtered slowly through cheese cloth for about one hour, no pressure being used. The coagulum was then washed twice with half a liter of water through a fine sieve and forced through by means of a wooden club. A half a liter of buttermilk was then added and a one-grain tablet of saccharin, in order to make the mixture palatable. A piece of cheese cloth placed in the sieve facilitated the process of passing the casein particles through. Only 5 out of the 42 cases in this series vomited to any marked degree after partaking of this food. In general, the quantity of albumin milk given corresponded to the usual feeding mixture for the respective age. It could be readily seen from the caloric value of the albumin milk that the caloric needs of the child could be covered nearly as well as by the ordinary milk mixtures. Finkelstein and Meyer advised the addition of carbohydrate in the form of malt soup or Leibig's extract of malt as soon as the quantity of milk given represented one-tenth the body weight, even though the stools had not become entirely normal. In their series of cases, maltose was added to the milk from the second to the eleventh day if there was no gain in weight. The duration of the albumin feeding in their series varied from two to fourteen days. Most of the German observers had continued the milk for from four to six weeks, but the service at Mount Sinai Hospital, being an acute one, this could not be done. In no instance did a relapse occur after the albumin milk was discontinued. In the severe cases weak tea was administered for from two to six hours before the albumin milk feeding was begun; in the less severe cases it was used from the beginning. No castor oil nor laxatives were given as a rule. Opium and astringents were not employed, but stimulants were administered when indicated. In most of the cases a change in the character of the stools

was noted in from three to five days. In 9 cases, mostly of the severe type, improvement was not perceptible within five days, though ultimate improvement did take place. In 4 severe cases no effect was noticeable at any time. In some cases the change for the better was most striking. Unless carbohydrate was added albumin milk did not necessarily produce a gain in weight, but it did check the marked losses that occurred under ordinary treatment. In the series under consideration some of the patients showed a gain of from four to six ounces during the period of albumin milk feeding. Loss of weight was noted in some cases, but in only two instances was it more than half a pound. In this series of 42 cases there were nine deaths, and 20 of the cases belonged to a very severe type of the disease; this was a mortality of 21 per cent. In 4 cases the albumin milk was given for four days or less, owing to the fact that the children were admitted to the hospital in a moribund condition, and excluding these cases, the mortality would have been 13 per cent. Of the 42 cases, 16 were under six months of age, and seven of these young babies had the disease in a severe form. These young children seemed to do as well under the albumin feeding as did the older ones. From the generally favorable results obtained, and from his bedside impressions, which were often more convincing than statistics, the writer felt justified in concluding that a distinct advance had been made in the treatment of the diarrheas of children. Albumin milk was indicated in diarrheas of any kind, no matter what the origin or nature, but it was especially indicated in those cases in which there was marked emaciation as the result of long fasting. In New York it had become possible to obtain the milk already prepared, thus overcoming one objection to its use.

DR. ROWLAND G. FREEMAN said that he had found the feeding of lact-albumin an excellent resource in babies under three months of age. He used a modification containing whey, but thought that it must be admitted that in some cases a dried milk preparation had an advantage over ordinary milk modifications.

DR. JOHN LOVETT MORSE, of Boston, said the diarrheas of infancy were due to very different causes. The bacteria in some types thrived on proteids, in others on carbohydrates; some were due to chemical disturbances and some to abnormalities in the food. On this account he could not see the rationale of albumin milk feeding. If the condition present in the infant was due to an



organism that throve on carbohydrates, it was easy to see that if the infant was fed on proteids the growth of that organism would be discouraged. The addition of lactic acid to the food in the buttermilk would, however, tend to neutralize its action. If the condition was due to an organism that throve on proteids, the withdrawal of sugar and the addition of casein would favor their growth. If the diarrhea was due to some lesion of the intestinal wall, probably caused by the fermentation of sugar, it was plain that taking away sugar and salt would do good, but here the irritant action of the lactic acid would do harm. In the latter class of cases the withdrawal of sugar and salts and the introduction of a large amount of proteid in the form of precipitated casein seemed very sound. In these cases, after the intestinal wall had returned to the normal condition, the feeding of maltose seemed desirable. Dr. Morse said that he used this.

He had the Walker-Gordon Laboratory prepare for him a mixture of cream, water and precipitated casein, made according to Finkelstein and Meyer's methods, which contained very little lactose and salts, and which could be varied to suit the individual case. In this way the addition of lactic acid in the buttermilk was avoided. When the stools had returned to normal he added a preparation of dextrin maltose in order to provide the required caloric value. This was a useful method of feeding, but it was difficult to determine in just what class of cases it was suitable. In a general way it was useful in those cases in which there were numerous watery, light green stools which irritated the buttocks. These were the acute cases. In the chronic cases the same evidences of fermentation were present, but in a less degree.

DR. FRITZ B. TALBOT said that he had seen sixty babies in a ward, the majority of which had had bacterial examination of the stools, and they had tried that modified food in each case that seemed to meet the biological needs of the bacteria. He could not conceive how albumin milk was of such value when they could not differentiate the acute infections. They had all seen babies with the identical symptoms of acute intestinal intoxication, who had living bacilli in the blood, and it was hard to see how the milk could touch the organisms in the blood of these babies.

DR. LINNAEUS E. LAFÉTRA said that the results that Dr. Heiman had obtained were very satisfactory. Some babies did not do well when there was added an extra amount of proteid.



Some years ago Dr. Chapin had told them that it was more rational to add casein than lact-albumin to the milk, since the casein was a nucleo-albumin and contained phosphorus and iron which were so necessary for the development of the child. He had used the albumin milk in the Babies' Hospital in 1910 in infants with ordinary diarrhea with blood and mucus in the stools. Sixty-two cases were treated with the albumin milk, and 21 of these were cases of severe diarrhea, many of them having stools containing blood and mucus. These babies were placed on the albumin milk when they had fever, and all of the cases with the exception of three improved. Of these three two died and the other was taken home. In the total series there were four deaths. The albumin milk had been given for from two to ten days. It was decided not to keep the babies on this milk unless they gained in weight. The main feature in the use of albumin milk was that the loss of weight was less during the acute period of the disease and the stools returned more quickly to normal than under any other treatment. He believed that all sorts of diarrheas were benefited by the use of the albumin milk.

DR. CHARLES GILMORE KERLEY said that in regard to Dr. Heiman's results in feeding albumin milk it was well to bear in mind that the year 1911 had furnished a very low mortality in intestinal diseases. The cases met with were mild in character. In the twenty-four years in which he had worked with these cases there had never been a time when the mortality was so low. When all other circumstances were taken into consideration these results of Dr. Heiman might not be such good ones after all. The work of the Berlin doctors could not be compared to the work of the Babies' Hospital in New York, where the babies brought in were very much sicker. Many of them were cases of autointoxication such as were seldom seen in Berlin. The type of cases in which they had found albumin milk most useful were those which gave indications of the dysenteric form of the disease. In his early experience the milk did not work well but that was because he did not understand its application.

DR. HENRY DWIGHT CHAPIN said he had used Finkelstein and Meyer's method of treatment of diarrhea in infants and thought it had a restricted value in certain cases. He agreed with Dr. Morse in what he had stated regarding the different causes of diarrhea. If a high protein was required it should be

split up into such a form as could be easily assimilated. Maltose was the form of sugar that he added to casein milk as it was more quickly assimilated and absorbed. He thought Dr. Heiman's mortality was rather high.

DR. HENRY KOPLIK thought that Finkelstein and Meyer deserved credit for the way in which they had elaborated their ideas in regard to feeding these babies with diarrhea. Finkelstein was right in saying that some of the younger babies would and others could not take this milk. The mothers could not always make it because it was so difficult to prepare. Finkelstein did not recommend this milk in every case, and he did not see the severe cases of diarrhea in Berlin that were seen in New York. Many of the cases admitted to the hospitals in New York were the marantic septic cases, and it would be impossible to save them with any form of treatment or feeding. As for himself, Dr. Koplik was not very much impressed with the results obtained by the use of the Eiweiss milk. The difficulty of preparing it had led him to exclude it in the treatment of these diarrheas and intestinal disturbances in private practice. He was not yet willing to relinquish the older methods that had proved of value in his practice. There had been many other methods of feeding in older children that had been as successful as this. He had seen instances in which the newborn with intestinal decomposition seemed to be harmed by every food used. In these he had tried the Eiweiss milk, but it did not seem to be sufficient to sustain the infants. There was no food yet placed at their disposal that would save a certain class of cases. It was not the food that cured but the disease that killed these babies.

DR. HENRY HEIMAN said that his series was not a selected one, and that there were many cases of the catarrhal form having blood and mucus in the stools. There was no treatment that would reach these cases and give satisfactory results. Personally, he believed the disease was a self-limited one like typhoid fever, lasting about ten days or two or three weeks. The administration of food was a matter of great importance, and he did not believe that there was any food which would give the babies so many calories as Eiweiss milk, thus saving their weight and strength and getting them in such condition that recovery would be more prompt. It was the feeding not the drugging that was important in these cases.

## THE PHILADELPHIA PEDIATRIC SOCIETY.

*Fifteenth Anniversary Meeting, January 9, 1912.*

J. TORRANCE RUGH, M.D., PRESIDENT.

### COLD AIR IN THE TREATMENT OF DISEASE IN CHILDREN.

DR. S. McC. HAMILL discussed the general principles involved in the application of fresh air to the treatment of disease. He spoke of the former antipathy to the exposure of the sick to draughts and low temperature and the gradual evolution—first airing rooms, then ventilation, finally constant opening of windows and placing patients in the open air. He reviewed our knowledge of the factors responsible for the destructive effects of shut-in atmospheres, considering carbon dioxide as less important than was formerly believed, laying stress on the bad effects of heat, moisture and still atmosphere, and commenting on the recent suggestive work of Rosenau and Ames, who have demonstrated the presence of organic matter in the expired breath of human beings by applying the reaction of anaphylaxis. Low temperatures are not injurious in their effects so long as the patient is protected from bodily discomfort by the application of a sufficient amount of clothing and bed covering.

DR. D. J. MILTON MILLER, of Atlantic City, N. J., discussed cold air in disease of the respiratory tract. This treatment is not new, as it has been in use since the days of Herodotus. The absence of fresh air is known as a cause of respiratory affections. After reviewing the ways in which the cold, fresh air acts, Dr. Miller said that he believed it indicated in tuberculosis, pneumonia, chronic bronchitis, fetid bronchitis, pulmonary gangrene, old empyema and laryngismus stridulus. It is contraindicated in asthma, emphysema, moist bronchitis, some forms of bronchopneumonia, laryngitis, the early stages of common cold and influenza. In the respiratory affections of early life the beneficial effects of cold, fresh air far outbalance its defects. The treatment is safe and highly beneficial in those affections, provided judgment, prudence and common sense are employed in its administration.

DR. E. E. GRAHAM discussed cold air in the treatment of diseases other than of the respiratory system. He described in detail the manner in which children should be exposed to cold air, laying particular stress on its good effect upon young infants.



He advocates its use in tuberculosis, typhoid fever, measles, whooping-cough, anemia and the acute gastrointestinal affections.

DR. J. P. CROZER GRIFFITH believes in cold air, but while good for many conditions it cannot be good for everything. The cold-air fad is overdone nowadays. He has observed recurrence of illness when a child is deprived of fresh air with return to health after the child was again exposed to the cold air. Cases of bronchitis and bronchopneumonia will do better without cold, fresh air; many other conditions will improve with cold air. Dr. Griffith believes that there is still a place in therapeutics for the croup tent.

DR. J. H. MCKEE uses cold air in pneumonia and certain toxemias. He exposes cases of epidemic influenza to cold air as long as they have fever, but never after temperature falls. Otitis and laryngitis should be protected from cold.

DR. CLAXTON GITTINGS spoke of two conditions in particular—bronchopneumonia with profuse bronchial secretion and acute bronchitis in children with adenoids. Apart from the irritating effects of cold air upon the air passages in bronchopneumonia, the irregular temperature constitutes a real difficulty in the cold air treatment. In croupous pneumonia the temperature is usually high and continuous, while the skin is apt to be dry. The amount of outer covering, which is of such importance, can be easily regulated. In bronchopneumonia, on the other hand, the temperature is subject to marked fluctuations and with the fall in temperature we often find a leaky skin. The problem of proper protection against cold and the avoidance of excessive covering is thus made more difficult. In cases with adenoids, in which acute attacks of coryza are so often followed by infection of the bronchial passages, Dr. Gittings has found that sending the child out into the cold air often greatly prolongs the bronchial irritation. Unless such cases can be treated in bed, at an even temperature without the variations encountered in going from house to street, he often finds it best to restrict the child, allowing it the free run of the house, but prohibiting trips out of doors. In this way the child will more quickly recover, so that the necessary adenectomy may be performed.

DR. E. J. G. BEARDSLEY stated that during the past five years he had enjoyed a rather extensive experience with the fresh-air treatment of disease in the crowded sections of the city. It had



been his experience that the mortality of pneumonia, even in patients who lived in what was usually termed "unfortunate surroundings," was practically *nil* if one could insure an abundant and continuous supply of fresh air, with proper food properly prepared and administered, and could prevent unnecessary medication. He had treated 187 children under twelve years of age with pneumonia without a death, and ascribed the success in a great measure to the fresh air. He had also observed that if patients with measles or whooping-cough were allowed to have an abundant and continuous supply of fresh air from the beginning of illness they rarely developed pneumonia.

DR. F. B. JACOBS spoke of a colored boy of five years, with croupous pneumonia, doing well while kept on the roof, who died an hour after being taken indoors. Dr. Jacobs added that he had noticed that some children did better if brought indoors after the fever had disappeared.

DR. S. SEILIKOVITCH said that he found cold air beneficial in croupous pneumonia, but not in bronchopneumonia. Oxygen is no longer necessary when cold air is used. He does not expose cases of measles to cold air, although he does expose children with whooping-cough. He thinks that cases of measles exposed to cold air contract pneumonia. Bronchopneumonia cases are benefitted by warm, moist air.

DR. HAMILL said that he utilized fresh air in the treatment of disease, as he utilized every other remedy which he applied to the treatment of disease, namely, according to the requirements of the individual case; and he believed that anyone who is so devoid of common sense as to not treat each patient as an individual had better withdraw from the practice of medicine. He did not agree with those who would exclude fresh air in the treatment of catarrhal conditions of the upper air passages. He treated these conditions with windows open sufficiently to admit fresh air and keep the atmosphere of the room in motion; and he was perfectly satisfied that his results were better than when he had treated such cases in the vitiated atmospheres of tightly closed rooms.

DR. GRAHAM believed that we should exercise care in cases of inflammation of the upper air passages. But a little common sense will solve many of these problems.

The President then delivered the annual address.

## CURRENT LITERATURE.

### ABSTRACTS IN THIS NUMBER BY

DR. T. WOOD CLARKE.

DR. RICHARD M. SMITH

DR. CHARLES E. FARR.

DR. C. D. MARTINETTI.

DR. S. FELDSTEIN.

DR. S. W. THURBER.

DR. J. HERBERT YOUNG.

### DISEASES OF EAR, NOSE AND THROAT.

HUNT, J. M.: TUBERCULOUS LARYNGITIS IN AN INFANT OF SEVENTEEN MONTHS. (*The Medical Press and Circular*, December 6, 1911, p. 604.)

A child of seventeen months of age was taken with croupy dyspnea. The temperature was normal. Examination of the larynx showed the laryngeal obstruction to be due to swelling and edema of the right aryepiglottic fold, which was superficially ulcerated. Tracheotomy was performed and the child given mercury. A fragment of tissue showed "granuloma, with typical gravel cells," and numerous tubercle bacilli. The child died in three months with signs of bronchopneumonia. Postmortem examination showed chronic pulmonary tuberculosis and general miliary tuberculosis. Tuberculous disease of the larynx is very rare under ten years of age. A few instances have been found of laryngeal tuberculosis in infancy at the postmortem table. This is probably the youngest case of laryngeal tuberculosis diagnosed during life.

T. WOOD CLARKE.

HOLMES, E. M.: EXAMINATION AND TREATMENT OF THE EUSTACHIAN TUBE BY THE AID OF THE NASOPHARYNGOSCOPE. (*Annals of Otology, Rhinology and Laryngology*, September, 1911, p. 511.)

Until the advent of this instrument, it has been difficult, and often impossible, to satisfactorily examine these regions in children. With an instrument that does not have to be passed through the mouth the vault of the pharynx and its sides and also the posterior nares can be most thoroughly examined by the use of a weak cocain solution in the nose, to render the passage of the small instrument almost imperceptible to the patient. In a table of 31 cases, the author has given the results of the examination and treatment in 11 children under fourteen years of age.

These all complained of various ear symptoms such as fullness, pain, snapping, deafness, etc. Examination with the nasopharyngoscope, in addition to the usual nasal and aural findings, revealed swollen mucous membrane, adenoids, posterior turbinate hypertrophy, secretion in epipharynx, pus in tubes, general congestion and bands of adhesions. These cases of acute secreting middle ear lesions were all treated by applying cocain and adrenalin to nose, nasopharynx and eustachian tubes and, after a few minutes, applying argyrol to the lumen of the tube under direct inspection through the instrument introduced in the opposite nares from the one through which the applicator is passed. The majority of the cases were relieved as completely as by paracentesis and were saved a running ear. The convalescence is also much shorter than in cases where a paracentesis has been done.

S. W. THURBER.

LEMAITRE, F.: CONCERNING NASOPHARYNGEAL FIBROMA (A PROPOS DES FIBROMES NASOPHARYNGIENS). (*Paris Médical*, September, 1911.)

Lemaitre reviews the literature of these peculiar fibromas, and reports 2 typical cases. According to him (1) these tumors usually develop in boys from twelve to fifteen years of age; (2) they are very vascular; (3) they are attached to the posterior nares by a pedicle; (4) although they may extend very widely and push aside adjoining structures, they never invade them; (5) they show no tendency to recur after complete removal; (6) histologically, the tumor is on the border line between benign and malignant neoplasm.

CHARLES E. FARR.

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### PATHOLOGY.

FREW, R. S.: ACETONURIA IN CHILDHOOD. (*Lancet*, November 4, 1911, p. 1,264.)

The urine from all children admitted to Great Ormond Street Hospital, 662 in number, was examined for acetone by the Rothera test, viz., 5 c.c. of urine are saturated with ammonium sulphate crystals; 2 c.c. of ammonia are added and then a few drops of freshly prepared 5 per cent. solution of sodium nitroprusside. Acetone gives a slowly developing permanganate color.

The specimens were examined twelve, thirty-six and sixty hours after admission. Acetone was found in 408, or 61.2 per cent. of the cases. The maximum amount was found thirty-six hours after admission. The acetonuria was transient except in two diabetic cases. The character of the disease from which the child was suffering did not influence the percentage. Of children under two years of age 47 per cent. developed acetonuria; of those from two to nine 68 per cent. Of infants under 1 year of age all which had been breast-fed before admission developed acetonuria on being put on the bottle. Of those which had been bottle-fed only 15 per cent. showed acetone. The author believes that the radical change in diet brought about carbohydrate starvation and resulting acetonuria through a temporary failure of digestion. The author concludes (1) that acetonuria occurs in childhood with great frequency; (2) that in the large majority of cases the carbohydrate starvation necessary for its production is caused by a temporary failure of digestion; (3) that this loss of digestive power can be brought about by mere change of diet; (4) that it is more easily set up the younger the child, and that the digestive inability becomes less marked as age advances; (5) that about three days are required before the digestive processes can accommodate themselves to a change of diet; (6) that disease with a few exceptions has no influence on the production of acetonuria in childhood.

T. WOOD CLARKE.

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## SURGERY.

LAWRENCE, W. S.: INJURIES TO THE ELBOW IN CHILDHOOD, STUDIED IN RELATION TO THE DEVELOPMENT OF THE JOINT. (*Surgery, Gynecology and Obstetrics*, January, 1912, p. 91.)

Lawrence emphasizes the differences between the adult and the child in fractures of the elbow joint, especially as seen in radiograms. However, there is not so much difference in the nature and extent of the injury as one might think from the differences in structure. The cartilage and ligaments of the child seem relatively stronger than the bone. Seventy-five per cent. of the injuries are transverse fractures of the humerus through the olecranon fossa, the widest, thinnest and weakest part of the humerus. This fracture is low down on the shaft, from one-fourth to one-half inch above the epiphyseal line and



from three-fourths to one and one-fourth inches from the end of the bone. The deformity simulates posterior dislocation or separation of the epiphysis, but the former condition is quite rare in children, while the latter practically never occurs. The author states that he has never seen a case of separation of this epiphysis in a child, and says that even the illustrations in the standard text-books are misleading in that the condition is always a fracture, well above the epiphyseal line. Lawrence does not approve of examinations under ether if an X-ray picture can possibly be obtained, because the X-ray can give us all more than we can learn under narcosis, without danger to the patient and without the possibility of increasing the injury. Moreover, it gives us an accurate record of the case. He objects very strongly to the classical right angle position, saying that we no longer expect to get a stiff elbow. The proper position is one of extreme flexion, watching, of course, the radial pulse. This flexion is best maintained by strapping the hand and arm to the chest with adhesive, leaving the point of the elbow free. A light splint may be used, but it does not accomplish much.

CHARLES E. FARR.

CATES, B. B.: SPINA BIFIDA. (*Journal of Tennessee State Medical Association*, Nashville, December, 1911.)

Of Cates' case, 5 were males and 2 females. All the tumors were meningoceles, except one, a meningomyelocele. Three of the cases were cervical and there was one each in the midsacral, lumbosacral, lumbar, and upper sacral regions. Two of the seven patients died. The author notes a family tendency to spina bifida and in his cases an association in the mothers with pellagra and with Grave's disease.

CHARLES E. FARR.

SAVARIAUD M.: PRIMARY TUBERCULOUS TUMORS AND COLD ABSCESS IN THE ABDOMINAL WALL (TUBERCULOMES ET ABCÈS FROIDS PRIMITIFS DE LA PAROI ABDOMINALE). (*Semaine Méd.*, Paris, December, 1911.)

The author has had 6 cases of primary cold abscess in the abdominal wall in the last two years, of which 3 were in children. He complains that none of the text-books mentions the possibility of a primary tuberculous focus in the abdominal wall. In one of his children the diagnosis of hydrocholecystitis was

made, although its extreme rarity in children was known. Fortunately the pus pocket in the rectus sheath was opened at once and the peritoneal cavity was not invaded. The pocket was cauterized and a cure was easily accomplished. The first symptom is pain, but this ceases after the tumor has attained a certain size. The tumor is not movable in the abdominal wall. Aspiration, with injection of various modifying fluids, has given good results in some cases, but radical surgical treatment is easy and gives perfect results.

CHARLES E. FARR.

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### MEDICINE.

MEARA, FRANK S.: THE TREATMENT OF GRIP. (*Interstate Medical Journal*, December, 1911, Vol. XVIII., No. 12, p. 1,179.)

Meara defines grip as an acute infection characterized by sudden onset, aching pains in the back and limbs, headache, high fever and catarrhal symptoms in the respiratory tract, which are followed by weakness and depression out of proportion to the other symptoms, and which may be accompanied or followed by serious involvement of important organs or systems. The attack is accompanied by the presence of one or the other, or of a combination of several organisms. Among these organisms is the influenza bacillus, but in by no means the majority of the cases.

At the onset of the disease the patient should be put to bed, a hot-water bottle put at his feet, a hot drink, with or without whiskey, and a saline cathartic given. The sudden fever, the severe headache and pains in the body and limbs all indicate antipyretics and analgesics. The best known antipyretics, in order of their potency and toxicity, are acetanilid, antipyrin and phenacetin. Any one of these may be used; better results are obtained from small doses frequently given than from large doses. Meara prefers acetanilid in doses of  $1\frac{1}{2}$  grains combined with 1 grain of soda bicarbonate and  $\frac{1}{2}$  grain of citrated caffeine. In severe attacks this prescription is given every hour for four doses, then every two hours. If relief occurs, the next day at three-hour and the next at four-hour intervals. The drug should not be too long continued; its benefit is confined to the early period of the infection. Phenacetin may be used alone or in the above prescription in doses of 2 or  $2\frac{1}{2}$  grains.

Otitis media and pneumonia are complications which should

especially be kept in mind in dealing with children. Also in children one may see symptoms of meningitis, which are more commonly due to meningismus. In such cases lumbar puncture should be done to determine the presence or absence of a purulent meningitis and also as a therapeutic measure.

Convalescence is often prolonged and should not be hurried. The best tonics are fresh air, sunlight, good food and properly proportioned rest and exercise. In children with a persistent coryza or slight bronchitis a change to a new locality, although relatively a few miles distant, is often followed by immediate improvement.

In considering prophylaxis, there are three sources of infection to keep in mind. First, those suffering from a "common cold," but not confined to the house; second, patients confined to bed, and third, chronic carriers. With the first class of cases, patients should be instructed that coughing and sneezing should be done into a handkerchief; sputum should be destroyed and intimate contact, kissing, etc., should be sedulously avoided. In the second class of cases, the family should be cautioned about remaining unnecessarily long with the patient; secretions should be burned or received into receptacles containing 5 per cent. carbolic acid; clothes in contact with the patient should be boiled; his utensils and thermometer should be kept separate, and after he has convalesced, the room should be fumigated with formalin. There is, at present, no adequate means of dealing with the third class of patients.

J. HERBERT YOUNG.

HECHT, D'ORSAY: ACUTE POLIOMYELITIS: REMARKS ON THE DIAGNOSIS IN THE LIGHT OF RECENT STUDIES. (*Interstate Medical Journal*, December, 1911, Vol. XVIII., No. 12, p. 1,171.)

Hecht, following Wickman's classification, discusses the clinical side of the less common types of acute poliomyelitis. He reports 2 cases, 1 in which both spinal and cranial nerve lesions occurred, the other in which there was ataxia, with involvement of the sixth, seventh and twelfth cranial nerves. The value of lumbar puncture in the meningeal type is emphasized. The designation "abortive" applies to those cases of poliomyelitis that appear concurrently with the more classic paralytic types, but manifest practically only the symptoms of the general infection; in other words, a case characterized by invasion symptoms with-

out paralysis occurring at a time when a neighborhood or epidemic infection with paralysis is known to exist would constitute an example of the abortive form of the disease. The polyneuritic form distinguishes itself by the appearance of pain and tenderness in the muscles and nerve trunks in excess of the generalized dysaesthesia, which may be present. The pain is polyneuritic-like and not actually neuritic in the sense of showing neuritic pathology.

J. HERBERT YOUNG.

SCHLIEPS, W.: CARDIOSPHYGMOGRAPHIC STUDIES IN TYPHOID FEVER IN CHILDREN. (*Jahrb. für Kinderhk.*, October 4, 1911, p. 386.)

These observations were made on over 100 children suffering from typhoid. Pronounced dicotism was never seen below fourteen years of age. True systolic bradycardia was an almost constant phenomenon at the beginning of convalescence. Its presence renders an examination for the Widal reaction desirable. Arrhythmia was frequently seen, being dependent on sinus irregularity. Arrhythmias due to other causes were never observed.

S. FELDSTEIN.

RACH, E., AND VON REUSS, A.: THE ETIOLOGY OF CYSTITIS IN MALE NURSLINGS. (*Jahrb. für Kinderhk.*, December 4, 1911, p. 684.)

Three cases of cystitis were reported, 2 due to paracoli bacillus and 1 to bacillus proteus. There was indubitable evidence that the lower intestine was the portal of entry. Infection of the bladder occurred either by way of the blood or by continuity through the diseased intestinal wall. An ascending urethral infection could be excluded. In contrast with these is cited a case of tuberculous cystitis, in which the lung was the primary focus.

S. FELDSTEIN.

FRANCAVIGLIA, M. C.: MYASIS GASTRICA. (*Riv. di Clin., Ped.*, February, 1911.)

Francaviglia describes a case of acute gastritis in a girl aged eleven years, who, after several weeks of severe illness, expelled by vomiting a number of larvæ. These were recognized to belong to *calliphora vomitoria* and *eristalis tenax*, both of which can remain unaltered in gastric secretions for some time. The local



irritation caused by the larvæ produces pain and a series of symptoms characteristic of acute gastritis, while by reflex action convulsions are frequently present. The administration of benzonaphthol or naphthalin is sufficient to cause expulsion of the parasite, thus rapidly putting an end to all the disturbance.

C. D. MARTINETTI.

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### HYGIENE.

TREDGOLD, A. F.: DULL AND BACKWARD CHILDREN. (*The Medical Press and Circular*, November 29, 1911, p. 577.)

The article deals with dull and backward school children as distinguished from mentally defectives. Statistics from various parts of Great Britain indicate that from 5 to 14 per cent. of school children are sufficiently backward to have decided difficulty in learning their lessons. The number of backward boys was usually greater than of girls. Mental development depends on heredity, general health and environment. The backward children may be classed as those of innate dullness and acquired dullness. The innately dull are usually strong, sturdy children, the descendants of generations of manual laborers, who usually, though backward in their studies, are often leaders among their fellows in matters requiring manual strength or dexterity or common sense. In such cases the time spent on book learning is almost completely wasted. For these there should be a modification of the curriculum to suit their individual ability and individual instruction. Such children can often be made skilled workmen or domestics in the time wasted on geography. The cases of acquired dullness may be divided into three classes—those backward from lack of opportunity, from partial blocking of the sensory avenues, as partial deafness or blindness, and from malnutrition or disease. Cerebral anemia due to general ill health is often a cause of lack of mental development. These cases constitute the backward children who are cured. Closely related to these are the overbright children who, owing to being forced too rapidly, acquire a condition of neurasthenia with mental hebetude. All cases of acquired dullness due to physical causes should be excluded from school until the physical infirmity is overcome. The school physician should concern himself

more with the mentally backward than he does at present, and should coöperate with the pedagogue to overcome the underlying cause of the mental dullness.

T. WOOD CLARKE.

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### THERAPEUTICS.

GRAHAM, EDWIN E.: THE TREATMENT OF PERTUSSIS WITH VACCINE. (*American Journal of Diseases of Children*, January, 1912, p. 41.)

The author reports the use of pertussis vaccine prepared from the bacillus of Bordet and Gengou, in the treatment of pertussis. The dose at first was small, but was finally given 40,000,000 every two days, for eight doses. It was used in 24 cases and he believes that his results were sufficiently gratifying to make a more extensive trial of the vaccine advisable. Out of the 24 cases reported, 7 were unchanged in their course. Seventeen, or 71 per cent., were apparently benefited.

RICHARD M. SMITH.

PLAUCHU, E.: RESUSCITATION OF ASPHYXIATED INFANTS BY THE INSUFFLATION METHOD OF MELTZNER AND AUER. (*American Journal of Diseases of Children*, January, 1912, p. 50.)

The author has applied this well-known method in the resuscitation of asphyxiated infants with gratifying results, and believes that many infants may be saved by this method.

RICHARD M. SMITH.

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### INFANT FEEDING.

VARIOT, G.: TREATMENT OF ECZEMA OF INFANTS BY CHANGING THE MILK (OBSERVATIONS SUR LE TRAITEMENT DE L'ECZÉMA INFANTILE PAR LES MUTATIONS LACTÉES). (*Gaz. des Hôp.*, No. vember 7, 1911, Vol. LXXXIV., p. 1795.)

Variot states that in his experience eczema is much more common in breast-fed than in bottle-fed infants and is almost always associated with digestive disturbances. He believes that in the breast milk of certain women there is a substance which is *eczématigène* for the infant. These women are often of a nervous temperament, some have passed their fortieth year, others have menstruated during the nursing period. Some in-

infants have eczema only when the mother is menstruating. Although analysis of breast milk has not, so far, revealed the cause, he is convinced that eczema of infants is due neither to a high percentage of fat nor to over-feeding. On this theory the treatment has been to substitute two or three bottle feedings a day for the breast. To each 100 grams of milk is added 1 tablespoonful of the following solution: Sodium citrate, 3 grams; simple syrup, 25 grams; distilled water, 125 grams. For local treatment he depends on starch baths and zinc oxide ointment. Improvement, not only in the skin, but also in the character of the stool, is noted in a few days. Sometimes, however, complete cure is not obtained until breast milk is stopped entirely. J. HERBERT YOUNG.

COURTNEY, ANGELIA M.: THE HARD CASEIN CURDS IN INFANTS' STOOLS. (*The American Journal of Diseases of Children*, January, 1912, p. 1.)

The author has investigated the relation of "casein curds" to the study of digestion and to nutrition. If the curds represent remnants of undigested food, then the composition of the curds should indicate the nature of the digestive insufficiency. Assuming that this undigested food coming through the intestinal tract is part of the food ingested, the gravity of the condition depends upon the proportion of food which escapes in the stools in this form. From a chemical analysis it was proven that the "casein curds" do represent undigested food principally in the form of protein. The curds reached their greatest number and occurred most regularly when the percentage of protein intake was of high value. The real mechanism of the curd formation is difficult to interpret, but evidently there must be some factors at play which prevent the enzymes from penetrating this curd, but no definite explanation of their nature has been discovered at the present time. The loss of food occurring because of curd formation is very small and does not lead to an appreciable decline in the utilization of food stuffs. The author concludes that, although casein curds do represent undigested protein matter, the loss of food and the impairment of general nutrition resulting from it is insignificant and in attempting to correct the state of digestion one should be guided by the general rules of infant feeding, paying only secondary attention to the appearance and disappearance of curds from the stool. RICHARD M. SMITH.

# ARCHIVES OF PEDIATRICS

APRIL, 1912.

ROYAL STORRS HAYNES, PH.B. M.D.,  
EDITOR.

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## EDITORIAL.

### THE FINAL REPORT OF THE ROYAL TUBERCULOSIS COMMISSION.

After ten years of experimental work the Royal Commission appointed in Great Britain to investigate the relation of human and bovine tuberculosis in man, has communicated its final report. The first and second interim reports were considered some years ago in the pages of this journal (Vol. XXIV., p. 456). At that time it was shown by experiment that almost all pulmonary tuberculosis is caused by the human type of tubercle bacillus, but that the bovine type causes abdominal and glandular tuberculosis, and that children are especially susceptible to this infection. This final report merely emphasizes these points. Of 28 cases of pulmonary tuberculosis, however, it should be noted



that 2 showed the presence of the bovine bacillus, proving that Koch's statement in this connection, although correct in general, is open to exception. Of 27 cases of primary abdominal tuberculosis, 13 showed the bovine type of bacillus. It is to be noted that there were 4 cases of fatal tuberculosis caused by this type of bacillus, showing its marked virulence for man in some instances—one of general tuberculosis, the second of tuberculous meningitis, the third due to tuberculous peritonitis, and one of stricture of the intestine following tuberculous ulceration.

As mentioned in the previous article, almost all cases of joint tuberculosis are due to the human type of bacillus. The final report shows that of 14 cases, where lesions of this nature were present, 13 were of the human type, and one of mixed infection. When a case of joint tuberculosis presents itself we are therefore generally safe in concluding that we are probably dealing with a case of infection from a human source, and it would not seem as if Raw and others have any basis for continuing to include this group of cases in the bovine category. This report includes for the first time a number of cases of lupus, and its results in this connection seem both interesting and of importance. Nine of these cases showed the bovine type of bacillus, 11 the human type. The bovine strains were less virulent than usual, but the very fact that many of these infections were of bovine origin must lead us to conclude that they were due to infections by food, probably from milk or butter, and gives us a new view of the etiology of this disease.

It would lead too far afield to consider the many experiments upon animals included in this comprehensive report. Histologic examination of 777 animals—domestic animals, birds, anthropoid apes, and many others were carried out. However, in this connection it should be noted that there were several cases of spontaneous human tuberculosis met with in pigs, which points to another possible source of infection, and should emphasize the fact that these animals should not be exposed to infection by means of human sputum.

The practical deductions of this entire work are very much the same as those of the preliminary reports:—

“A considerable amount of the tuberculosis of childhood is to be ascribed to infection with bacillus of the bovine type transmitted to children in meals consisting largely of the milk of the

cow." "Measures for securing the prevention of ingestion of contaminated milk would greatly reduce the number of cases of abdominal and cervical glandular tuberculosis in children, and that such measures should include the exclusion from the food-supply of the milk of the recognizably tuberculous cow, irrespective of the disease."

ALFRED F. HESS.

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### POPULAR LECTURES ON HYGIENE.

We have included, by request, among the papers in this number of the ARCHIVES, a series of papers read before a lay audience, namely before a meeting on Child Hygiene held under the auspices of the New York County Medical Society. We believe that the subjects will not be without interest to the readers of the ARCHIVES and may point out an example which will result in a similar work being undertaken elsewhere. The Public Health Education Committee of the New York County Society has now for two years conducted a series of evening and afternoon lectures upon medical topics, about which the average man and woman knows little and should know more. Sessions have been devoted to Nervous Diseases, to Colds, to the Hygiene of Men and Women, and others; and three papers have usually been presented. Opportunity has been given at the close of the session for questions from the audience and a wholesome discussion has often ensued. The courses have been extremely successful and have done much to make the general public appreciate how sincere is the effort of medical men—and women—to better the health of the community and to do away with disease.

Such lectures would be helpful everywhere. The American Medical Association has done an admirable work along these lines throughout the United States and the dependencies, but the field is not yet completely covered. The ARCHIVES urges its readers throughout the country to organize such lecture courses for next winter and to begin now.\*

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\* Information about the course given by the New York County Society can be obtained from Dr. Rosalie Slaughter Morton, 701 Madison Avenue, New York, who is chairman of the Public Health Education Committee of the Society, and who was responsible also for the organization of the Public Health Lectures of the American Medical Association.

## ORIGINAL COMMUNICATIONS.

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### IS THERE ANY VALID OBJECTION TO VACCINATION?\*

BY CHARLES W. BANKS, M.D.,

East Orange, N. J.

The term "vaccination" in the topic of this paper has reference to the prophylactic measure in common use against small-pox.

I wish to call the attention of this Society to a subject which at first sight might occur to one as a little shopworn, but for the reason that there is now and then considerable opposition to compulsory vaccination on the part of certain individuals in many communities, and, furthermore, that inasmuch as there is an uncertain emphasis on the part of some members of our profession in the matter of the enforcement of this law it has seemed to me proper to present the matter to this Society with the hope that it may awaken the responsibilities which rest primarily upon the medical profession to the end that no uncertain position on our part will cloud the public mind as to the very great importance of compulsory vaccination to the State.

When we recall the mass of evidence which has accumulated during the last century in favor of this measure of prophylaxis, we are quick to say that the case admits of no argument and express surprise when opposition arises to facts so thoroughly established. The fact remains, however, that every opponent has some fancied just cause for the faith within him and pursues it with such vigor in some instances as to persuade official bodies to relax their vigilance over the welfare of the community in which they have jurisdiction.

The anti-vaccinationist is usually heard from when his child is required to be vaccinated before entering school. He talks so glibly on the subject that he is apt to convince those who are not conversant with the facts of the question that he really knows what he is talking about. Cases are cited which have resulted disastrously. He is possessed of a humane motive which would make a rabid antivivisectionist green with envy. He may

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\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Hotel New Monmouth, Spring Lake, N. J., June, 1911.

be sincere, but the difficulty with him is he is not in possession of the truth about vaccination.

Many of us have seen a complicated vaccination, but we know that in every instance the technique of the operation or the subsequent care of the wound have been the factors which have operated viciously and the virus itself has in no wise been responsible. Before the days of aseptic surgery bad results were not unknown, but, today, we know that with ordinary consideration for the principles of clean surgery we have a right to expect no deviation from a normal vaccine reaction. The factor of infection of a vaccination wound is constantly present, especially in the case of children, and it is therefore incumbent on us to protect each case against himself by a careful dressing and a subsequent care which precludes the possibility of such an accident.

Statistics show that even in the event of an infection, only 1 case in 65,000 vaccinations resulted fatally.

Voight reports 2,275,000 vaccinations in Germany, with a total of 35 deaths. He later reports 100,000 operations with but 1 death. Hodgetts reports 40,000 vaccinations in Ontario, Canada, without a death.

The anti-vaccinationists sometimes argue that vaccination is useless and cases are cited where small-pox has been contracted even when the patient had been vaccinated. Now, then, the term vaccination may mean a successful vaccination or it may not. We all know that there is a disposition on the part of many patients to regard the scratching of a limb and the rubbing in of vaccine as a vaccination, even though no characteristic reaction and no typical scar follows. The patient may not be entirely to blame if he tells you later that he has been vaccinated, because he is not expected to know all that the term implies. Or it may even happen that a patient may have had a severe inflammatory reaction and a resulting large scar, but it need not follow that his vaccination has been a success. Such cases as these are not protected and a subsequent contraction of the disease would appear to make this means of protection of no value. Then again, it is not claimed that one successful vaccination protects the patient during his lifetime. An average period of protection is from six to seven years.

Dr. Spalding, Chief Medical Inspector of the Chicago Board of Health, in an article on "Some Facts about Vaccination," read



at the fifty-third annual meeting of the American Medical Association, had this to say about the utility of vaccination: "Vaccination on entering the school, and again seven years later, is the protection from small-pox given the 265,000 school children of Chicago, and in ten years but 7 cases of small-pox have occurred among the school children, and all of these were in school with a false certificate of vaccination. In one instance last year a child with a false certificate attended school two weeks while he had a mild form of small-pox and but one child in the school took the disease, and this child was also in school with a false certificate. No vaccinated child in the Chicago schools has had small-pox during the last ten years, though Chicago suffered a severe epidemic of small-pox in 1894 and 1895, and has had a mild continuous epidemic of the disease for the past three years."

"From March 9, 1899, to June 5, 1902, there were 591 cases of small-pox in the Chicago Isolation Hospital. Of these, 535 had been vaccinated; 8 had typical old marks made in childhood from sixteen to fifty years previous to the attack; 48 had some kind of an old, doubtful, or imperfect mark, said to have been the result of a vaccination performed many years before. Not one of the 591 cases had been vaccinated in accordance with the requirements now known to be necessary for protection against small-pox."

In the Public Health Reports of March 10, 1911, Drs. Heiser and Oleson, in the article on "Small-pox and Vaccination in the Philippine Islands," say: "At probably no time in the world's history has the efficiency of vaccination as a preventive for small-pox been so conclusively and effectively demonstrated as in the Philippine Islands since American occupation. The evidence of its value is incontestable. During Spanish times it was necessary each year during the dry season to erect in Manila a large temporary hospital, to which many hundreds of victims of small-pox could be taken. The great majority of them died. During the past five years not one person has died in Manila from small-pox who had been successfully vaccinated during the five previous years; nor has anyone died of small-pox in Manila since June, 1909.

Since 1907, when the systematic vaccination was completed of the six provinces near Manila, which have an approximate population of 100,000, and which from time immemorial had an annual average mortality from small-pox of at least 6,000 per-

sons, not one person has died of small-pox who had been successfully vaccinated, and only a few scattering cases have occurred. During the past two years some deaths have been reported, but careful investigations show that not one death took place in a vaccinated person."

Small-pox is a comparatively rare disease at the present time in vaccinated countries. This is not true, however, of countries in which vaccination is greatly neglected. According to the statistics compiled by the German Imperial Board of Health, there were 275,502 deaths from small-pox in five years from 1893 to 1898 in the Russian Empire, including Asiatic Russia. In Spain, with a population of ten and one-half millions, there were 23,881 deaths from small-pox during this period. Hungary had 12,241 deaths, Italy and Austria 11,000 deaths each. In Germany, however, where vaccination is compulsory, and the population is five times that of Spain, the total number of deaths during the same five years was 287, and these were largely in persons of foreign birth, who had not been subjected to the vaccination laws of the country. In 1897 there were but five deaths from this disease in the entire German Empire. Japan, with 47,000,000 people and a stringent vaccination law, had only 4 deaths in 1901 and 6 in 1903.

In the Philadelphia epidemics of 1901 and 1908 there were 5,000 cases and 500 deaths. Not one of the fatal cases had been successfully vaccinated within ten years. In the Baltimore epidemics of 1901 and 1904, 4,000 small-pox patients were treated in the Municipal Hospital and not one of them had been successfully vaccinated within five years and only a few within ten years.

The statistics of every country in the world where vaccination and small-pox have been studied prove beyond any question of doubt that no patient recently successfully vaccinated has ever contracted the disease. Even in the cases of those patients where a successful vaccination has been performed years previous to an exposure to the disease, the patient may either escape the infection or else show a degree of immunity which modifies the virulence of the disease.

Another argument of the antivaccinationist is that an enforced vaccination trespasses the rights of the individual.

The laws of our government which comprise the basic structure of our civilization consider the fact that a man has not a

right to do as he pleases when the welfare of the community is at issue. The police power has been judiciously defined—"to be that inherent and plenary power in the State which enables it to prohibit all things hurtful to the comfort and welfare of society. It extends to the protection of the lives, limbs, health, comfort and convenience as well as the property within the State, and to accomplish this end persons and property are subjected to all kinds of restraints and burdens."

The records of every country show that there is almost a universal susceptibility to small-pox, and in addition that it is exceedingly rare for an unvaccinated individual, exposed to the disease, to fail to contract it. Then, is it not a fact that such an unprotected person may easily become at any time "distinctly hurtful to the comfort and welfare of society"? Such, in fact, is the decision of the highest courts wherever the legality of the question of compulsory vaccination has been tested.

There is a species of antivaccinationist who dissents to every proposition under the sun. He is found in every community, but his pseudo-plausible argument should have no weight with those who have jurisdiction in this matter.

We have no federal compulsory vaccination law. Most of our civil and military offices—our schools and many other public institutions—have a vaccination enforcement. It is fair, therefore, to assume that there are thousands of unvaccinated individuals in every state of the Union who on the slightest exposure to the disease may contract it, and not only become a grave menace to the health of the community, but from the general fear of the disease seriously affect the business interests of the locality in which it may be prevalent.

Dr. James Roberts, of Hamilton, Ontario, in the *Journal of American Medical Association* of September 12, 1908, writes of an outbreak in his city in which 80 patients were afflicted. The expense to the city amounted to \$10,000. No evidence was found that in more than one or two instances vaccination had ever been performed.

Similar experiences are a part of the history of every village and city of this country.

In the State of New Jersey, according to the Public Health Reports, Vol. 26, No. 10, there were 28 cases of small-pox from January 1st to February 28th of this year. In the same report we find from January 1 to March 3, 1911, as follows: Alabama,



9 cases; California, 28; Colorado, 379; Florida, 661; Illinois, 48; Indiana, 200; Iowa, 181; Kansas, 179; Louisiana, 219; Michigan, 214; North Carolina, 1,917; Minnesota, 207, etc., making a total for that period of reported cases in the United States of 5,647, and a total number of deaths 28.

Here in a period of a little over two months we have the same number of deaths as the German Empire with 54,000,000 people did in the year 1889.

Now, who will say that the subject of vaccination against small-pox is not an ever present live question for men in official positions to consider? Can you conceive how anybody, having jurisdiction, as for instance a Board of Education, whose business it is to enforce a compulsory vaccination law, should for a moment question the wisdom of such a procedure?

We can understand how a question of politics might enter into a local situation or possibly the argument of a "leading citizen" could be operative upon the minds of men of easy persuasion, but how on the basis of scientific proof and the statistics of empires any concession can ever be made is beyond understanding and is distinctly a movement backward to the terrible ravages of small-pox of a century ago. A suitable soil for the continued prevalence of the disease with its accompanying loss of life and health and the very great expense to the municipality wherever it occurs, is the only outcome of the successful anti-vaccination agitation.

THE CONGENITAL MONGOLIAN BLUE SPOT.—E. Apert (*Presse méd.*, March 26, 1910) describes a peculiar bluish spot that is found over the sacrum or a little higher up in children who are of the Mongolian races or have a taint of Mongolian blood. This is caused by pigment in the deeper cells of the skin. Pressure upon the skin does not cause its disappearance. It is rarely seen in the European races. In the negro it is absent. In form it is generally oval. The deep cells of the derma contain black pigment. The practical considerations connected with the study of this phenomenon are the fact that we can state to the parents of a child who shows this mark that it is not abnormal, and has no pathologic significance, and that it will gradually disappear of itself before the age of puberty.—*American Journal of Obstetrics.*



## CONTACT INFECTION IN CONTAGIOUS DISEASES.\*

BY B. VAN D. HEDGES, M.D.,

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One of the most interesting problems that has always confronted the epidemiologist has been the modes of infection in contagious diseases. That widely divergent views have been held is not to be wondered at when we consider that it has only been within comparatively very recent years that the germ theory of disease has been discovered and appreciated. And even to-day we are practically in the dark as to the causal factors at work in two of our most common contagious diseases, namely, measles and scarlet fever.

The object of this paper is to call attention very briefly to what the writer believes to be the most frequent and potent cause of all contagion, namely, contact infection, as opposed to infection by fomites and air.

Contact infection may be either direct or indirect; the well person coming in direct personal touch with the sick, or the fresh infective material being transferred in a short interval of time from one to another by a second person before it has had time to become dry and inert.

By fomites we mean infective clothing, toys, bedding, baggage, money, rags, etc., which may retain their infectivity for weeks, months, or years. The dividing line between these two classes is not clearly and sharply defined, and no one familiar with the subject can deny that under exceptional circumstances infection may occur through fomites. But we believe these instances are rare, and the exception rather than the rule. Nowhere is the fallacy of the fomites theory, as universally applied, better illustrated than in yellow fever, where for years Boards of Health not only destroyed the personal effects of the patient himself, but also the clothing of those who came in contact with the patient, or even had been in the infected zone.

What is the evidence that leads us to believe that fomites bear only a small part in the transmission of disease? Bacteriological research shows that all non-spore disease producing germs survive but a short time outside the body, and then only under exceptional circumstances, air and sunshine being decidedly inimical to their growth and proliferation. Williams<sup>1</sup> in

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\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Spring Lake, New Jersey, June, 1911.

experiments on diphtheritic bacilli found that germs could not be recovered after twenty-four hours from pencils moistened by the lips of patients who had the bacilli in their throats.

Weichardt<sup>2</sup> took 300 swabbings from various things in a sick room occupied by a diphtheritic patient, and 250 from other parts of the house, and found diphtheria germs only three times, and then on objects which had been in contact with the patient's mouth.

In Providence, Chapin, whose recent book on this subject is a classic, took 200 swabbings under similar circumstances, and found no diphtheria bacilli.

Kober<sup>3</sup> could find no bacilli on the floor, bed linen, etc., of ten houses in which there had been diphtheria.

Doty<sup>4</sup> relates an interesting experience that occurred during the outbreak of typhus and small-pox in 1892 in New York City. "The epidemic continued until the early part of 1893, and included almost 1,000 cases of small-pox and over 700 cases of typhus fever. The corps of physicians and employees connected with the Bureau of Infectious Diseases of the Department of Health at that time numbered over 80 persons, and consisted of diagnosticians, medical inspectors, ambulance drivers, helpers, etc., who were constantly exposed to and frequently in close and prolonged contact with cases of these diseases. No gowns were used for protection, and the persons above referred to went frequently and freely to and from their houses, and in no instance did they transmit typhus fever or small-pox to any of their families or friends, among whom there were undoubtedly those who had not secured the protection of vaccination. During the outbreak above referred to, the most thorough investigation was made in each case of these diseases reported to the Department of Health to determine their origin, and, with comparatively few exceptions, it was found that they were transmitted directly from one sick person to another. In many instances it was found that other cases of the same disease existed in the same family or among the relatives and friends of the sick, which had been unrecognized, and the individuals had been treated for some other ailment."

If the fomites theory is correct money ought to be a most frequent and prolific source of spreading infectious diseases. It is held in the hand, often moistened with saliva from the lips, and kept in the pocket away from light and air; and yet careful

investigation among bank clerks and surface car conductors shows that there is no greater ratio of scarlet fever and diphtheria among these people than among any others.

Hilditch<sup>5</sup> says: "The United States Treasurer, who has given this subject long and careful consideration, is emphatic in his statement that there is not the slightest evidence to show that the employees in his department contract infectious diseases any oftener than others who are not in this line of work." While in Washington recently I personally interviewed an old clerk in the Treasury Department, who for the last twenty years had superintended the assorting of old bills sent in for redemption. His testimony was to the same effect that, during this entire time, he had never seen any case of contagion due to this cause.

Infection by air I believe is of even less significance than fomites, and yet from time immemorial it has been regarded as of vital importance. If malaria is due to the insidious miasmas and vapors arising from the earth, what could be more reasonable than that there should surround the bodies of those sick with contagious diseases an atmosphere of infection equally potent and virile; and what was to hinder this infection from being carried from the house through the open window, and distributed far and wide by the wind? A woman of my acquaintance, during an outbreak of small-pox in Plainfield, even refused to talk over the telephone to a convalescent small-pox patient in the hospital two miles away for fear of contracting the disease through the electrical current. It is no uncommon circumstance for people to walk blocks out of their way to avoid passing a house where there is a case of scarlet fever or diphtheria.

Intelligent nurses and doctors to-day will keep the door of the sick room hung with a sheet constantly moistened with bichloride, in order to prevent the escape of germs, and on the mantel of the sick room will be seen small saucers of a carbolic mixture to antisepticize the atmosphere.

Is this sense or is it nonsense? Fortunately, practical experiments during the last few years have settled the question for us in a very practical way. At the Pasteur Hospital in Paris cases of scarlet fever and diphtheria for the last two years have been admitted to the general wards. They occupy separate stalls, with partitions extending up only four feet, and each stall directly communicating with the general ward. The same nurse that cares for the children ill with pneumonia or gastroenteritis looks



after the cases of scarlet fever and diphtheria. The only precaution taken is that, after handling the contagious case the nurse shall give her hands and nails a most thorough scrubbing and cleansing. She only wears a gown when making a throat application, as, for example, in diphtheria, where there is danger of having the fresh infective material thrown directly against the dress. The results under this regime have been most satisfactory, and there have been no cases of transference to other children in the ward.

Dr. Wm. P. Northrup now treats all cases of diphtheria developing in his ward at the Presbyterian Hospital in New York in this same manner, without removal or isolation, the only difference being that he surrounds the patients with a wire screen instead of putting them in a separate wooden stall. His results have been equally satisfactory.

Scarlet fever, on account of the supposed infectivity of the desquamating epidermis, was regarded as being particularly an air-borne disease, and yet the best thought among epidemiologists in Europe and England today is that these scales are not at all contagious, except as they may become infected from the discharges from the mouth and nose. This is my own personal belief, and I have yet to see a case where I thought the contagion was due to this cause. Some of us here can remember when an aerial infection was considered to be the main danger in operative surgery, when the field of operation was kept constantly moist by a carbolic spray. Ochsner<sup>6</sup> says: "Air infection is not impossible, but practically no wound infection is to be considered except from contact." The danger is so slight that the spray has practically been eliminated today from every operating room, and yet the two situations are practically parallel.

And this brings us to a consideration of the real and potent factors in the spreading of contagious diseases, namely, personal contact, and the so-called "missed" or "carrier cases." It has been a personal experience with all of us that, no matter how careful we may be in our isolation of the sick, or how thoroughly we may fumigate all infected apartments, we are powerless at times to check the spread of the disease. This is so peculiarly true in regard to measles that we no longer place any official quarantine on the house, realizing that the greatest danger of infection lies in the early catarrhal stage before the diagnosis has been made and when the children freely intermingle.



To an almost equal degree this is true also of diphtheria and scarlet fever. The early sore throat, regarded at first as simply a mild case of tonsillitis, is only pronounced diphtheria after a lapse of two to four days; and during all this time the child has come in close personal contact with its neighbors and playmates. Practically the same situation confronts us in scarlet fever—the seeds of contagion have been sown—the colt has been stolen before we lock the stable door. If this is true for the first few days of the disease before isolation has been effected, what must be the danger from the missed cases, with symptoms so mild that no diagnosis whatever has been made! Chapin, of Providence, has estimated that in diphtheria these fully equal, if not exceed, the number under quarantine.

We must also reckon with the pure carrier cases, where no symptoms whatever are shown, and yet where cultures from the throat show the presence of Klebs-Loeffler bacilli. Although it is claimed by some that these carrier bacilli are of such mild virulence as to be practically disregarded as causal factors, Park,<sup>7</sup> of New York, has demonstrated by inoculation on guinea pigs that fully 15 per cent. to 30 per cent. of these "carriers" have malignant bacilli present.

The rôle of the "carrier" in typhoid has recently thrown light upon many cases of that disease hitherto unexplained. The history of "Typhoid Mary," a cook who infected twenty-six persons living in six families, residing in five localities in three states, between 1901-'06, is known to everybody. She gave no history of typhoid, but her stools were teeming with virulent bacilli. That the danger from these cases is real and not fanciful is well attested by numerous authoritative reports. Hellstrom<sup>8</sup> notes an outbreak of diphtheria in a calvary regiment due to two soldiers, who, although perfectly well, had the bacilli present in their throats.

Edsall<sup>9</sup> notes five outbreaks due to "carriers," and Solis-Cohen<sup>10</sup> seven such outbreaks. Similar cases have been collected by the Massachusetts Association of Boards of Health,<sup>11</sup> Nuttall,<sup>12</sup> Graham-Smith,<sup>13</sup> Newsholme,<sup>14</sup> Sittler,<sup>15</sup> Niven,<sup>16</sup> Schneider,<sup>17</sup> Chapin,<sup>18</sup> and many others. In 1906 an outbreak of diphtheria in Birmingham<sup>19</sup> was traced to two milk handlers, who had the bacilli in their throats, but otherwise seemed perfectly well. The outbreaks ceased as soon as they were isolated. Similar outbreaks have been reported from Fitchburg,<sup>20</sup> Lowell,<sup>21</sup> Brook-

line,<sup>22</sup> Montclair, N. J.,<sup>23</sup> Oroville, Cal.,<sup>24</sup> Australia,<sup>25</sup> and other places.

In scarlet fever, where no specific organism has as yet been discovered, it is more difficult to estimate the number of "missed" or "carrier" cases. But we can all recall instances where the rash has been so slight as to almost escape detection. In a school of 300 children, Thornton<sup>26</sup> found 31 typical cases, 19 with no rash and slight sore throat, and 46 cases in which only desquamation was noticed. Caziot,<sup>27</sup> Welch and Schamberg,<sup>28</sup> Cameron<sup>29</sup> and Butler<sup>30</sup> also report similar instances.

I have purposely confined this discussion mainly to scarlet fever and diphtheria, because they are the diseases most commonly met with in infancy and childhood, although the general principles involved apply to all contagious diseases. The time limits of this paper have allowed only the most brief general consideration of the subject, but in ending I should like to emphasize these general conclusions:—

(1) The theory of infection by fomites and air has been accepted from time immemorial; not from scientific, but from *a priori* grounds.

(2) That while admitting the possibility of infection from these sources in certain isolated cases, the danger is far less than commonly supposed.

(3) Contact infection and the danger to the community from "missed" and "carrier" cases are the most potent factors in the spread of these diseases.

(4) That by observing the simple laws of personal cleanliness, by scrupulously cleansing the hands and nails after contact with these patients, the danger incurred by the physician or attendant in transferring the disease to others is reduced to a minimum.

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TREATMENT OF WHOOPING-COUGH BY FLUOROFORM.—Mathilde de Biehler (*Arch. de méd. des Enf.*, July, 1910) give the results of the observation of 232 cases of whooping-cough treated with fluoroform solution, with success. The author claims for this medication that it shortens the attack by some weeks, and renders the attacks of cough less frequent and less severe. Of the patients 185 were seen at the beginning of the disease, and 117 at the end of two or three weeks. In 38 cases treated from the beginning, in families in which there were already other cases, a cure was obtained in ten to fifteen days. In 186, cure was obtained in three or four weeks; in 8, at the end of seven to eight weeks. In these cases the number of attacks of coughing was much decreased. In 18 cases there were complications. There were 4 deaths, 2 from pneumonia, with meningitis in very young infants, when treatment was not begun until several weeks had passed. The author observed no sublingual ulcers, vomiting, or hemorrhage. Fluoroform is a drug that merits the attention of the practitioner; it is not poisonous, even in large dose, and is well borne by even the smallest children. The author thinks it quite possible that it will prevent the disease, as well as modify its severity. In the case of a woman in danger of abortion from whooping-cough the use of this drug stopped the vomiting and lessened the cough so that the pregnancy went on to term and the infant was delivered normally. By examining the blood of the little patients it was seen that the leukocytosis that always occurs in this disease began to diminish as soon as the drug was used. The dose of the solution should begin at 10 to 15 drops three times a day and after each attack 5 to 10 drops, up to 200 or 250 per day. It should be increased until the desired effect is obtained.—*American Journal of Obstetrics.*



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## THE PREVENTION OF THE COMMONER CONTAGIOUS DISEASES OF INFANCY AND CHILDHOOD.\*

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It may seem unnecessary to point out to an audience composed largely of parents and teachers the necessity for the prevention of the commoner contagious diseases of infancy and childhood. One who has experienced the anxieties, the inconvenience, the expense of such visitations, even if recovery has saved them from the grief which comes to far too many, will hardly take a moment to say emphatically that they should not be. There are people, however, who think and say that children must have these diseases and willingly expose them to contagion that it may be over. No greater fallacy ever existed, or greater menace to the community.

I do not suppose that there are any here who believe this, but in order that you may combat such ideas it will interest you to consider some figures showing what these diseases mean to our city of New York.

In 1909 there were in the greater city 12,475 cases of measles reported; and probably a goodly number never reported or even seen by a physician. In 1910 there were 18,924 cases. Almost all of these were among children, for measles, as you doubtless know, is so extremely contagious that few grow up to have it as adults.

Scarlet fever cases were reported to the number of 31,954 in 1909 and 35,374 in 1910. Thirty-five thousand cases of a disease which is one of the most dreaded of all those affecting children because of its deaths and because of the permanent injury to heart or kidney or hearing which it may leave behind!

Diphtheria presented even with antitoxin treatment 15,097 reported cases in 1909, and 16,940 in 1910.

Even whooping-cough, the danger of which so few persons realize, had 2,752 cases reported in 1909 and 2,018 in 1910. You

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may be sure that this represents not one-quarter of all the cases which existed, for, as with measles, and to a much greater extent, this disease is not reported or even seen by the physician.

Compare these figures with the incidence of small-pox, in which a true and lasting preventive has been known for a hundred years, before which time practically every member of the community had the disease before he was six years old. In 1910 there were 9 cases of small-pox in the greater city of New York.

The total number of cases of these diseases was, in 1909, 72,073, and in 1910, 82,022.

The deaths from these diseases during 1910 were:

From measles.....	785
From scarlet fever.....	953
From diphtheria.....	1,715
From whooping-cough.....	461
From small-pox.....	5

and these figures are all below the average number of deaths from these causes during the past ten years.

Compare this to typhoid fever, the mere mention of which brings fear and apprehension to all. The total number of deaths from typhoid fever in 1910 was 558, nearly equalled by the mortality of whooping-cough, little more than one-half that of measles or scarlet fever, less than one-third the mortality from diphtheria!

Is there any doubt that they should be prevented?

Moreover, each of these 82,022 cases of contagious disease has meant that an individual has been ill, has suffered to a greater or less extent, has lost time at school, has required the services and time and strength of someone to nurse him, has in most cases needed the services of a physician and has many times cut down the earning power of the family directly or indirectly, and cost a goodly sum for food and medicine. We can thus realize perhaps what such a visitation means each year to our community, to say nothing of the loss of life, and this when the authorities are working to hold things in check. The danger of an epidemic is constantly before us, and when it comes it brings with it a much larger drain upon the commonwealth, both in lives and money.

"For some years previous to February 25, 1885" (I quote from the Report of the Maine Board of Health for 1885) "there

had been no cases of small-pox in Montreal. On this date a Pullman conductor by the name of Shattuck came to his home in Mayor Street sick with small-pox. The house was isolated, disinfectants used and Shattuck recovered. Unfortunately two young ladies left the house as soon as they learned the nature of the disease and before the quarantine had been put upon the house. One of these young ladies went to St. Andrews, where she fell into intelligent hands and was so cared for that when she fell ill of small-pox no other cases resulted at that place. The other young lady also became sick, but was persuaded to return to the infected house on Mayor Street. No other cases in the city could be traced to these.

"On February 28th, it happened that another Pullman conductor, by the name of Longley, on an incoming western train, was found with small-pox. He was carried to the Hôtel Dieu, and admitted into that hospital and placed in a room with another patient who had not had small-pox. A few days after this he was transferred to another room with another patient who had not had small-pox. The disease was mild in the case of Longley and he left the hospital on March 21st.

"At the time of his admission into the Hôtel Dieu, there were about 240 patients in the hospital, and it seems that no precautions whatever were taken to prevent the spread of the disease to these other patients; so we read that, a few days after the departure of Mr. Longley, a servant in the hotel came down with the disease and died on April 1st. A few days later her sister was taken; two days afterward, 2 other cases, and on April 10th 2 more cases. Between April 8th and 18th there were 16 patients transferred from the Hôtel Dieu to the Civic Hospital.

"On April 14th the Medical Faculty of the Hôtel Dieu proposed to the Sister Superior to dismiss all the patients who seemed to have no symptoms of the contagion and who could go home, *and this they actually did*. Fifty or sixty of the patients remained, the remainder were scattered over the city, where for some years among the French Canadians vaccination had been opposed."

As the commentator in the report goes on to remark with much pertinence, "these initial proceedings in sowing the seeds for an epidemic need no comment here further than to say they were ultimately abundantly successful."

The first death from small-pox in Montreal was on April

1st. Including this, the deaths from this cause were by months as follows: April, 6; May, 10; June, 14; July, 46; August, 239; September, 659; October, 1,393; November, 633, and December, 165, a total of 3,164. We may compare this to the previous mortality from small-pox in Montreal, which in 1880 was 140; in 1881, 5; in 1882, 1883 and 1884, none.

Of these 3,164 deaths, 2,560 were in children under ten years, thus reverting to the conditions of the eighteenth century before vaccination; and of the 3,164 deaths, 2,888 were among the French Canadians who refused to be vaccinated and refused vaccination for their children.

The disbursements of the Health Department in that small city for small-pox work were \$137,770.60. But the total loss to the community was far greater than this. It was estimated that an epidemic of about the same size cost Philadelphia \$21,000,000 when all sources of expense were reckoned in.

Montreal became a source of danger to her neighbors also, and at one time in the Province of Quebec there were 181 villages infected. Contrast this with the State of Maine, bounded on the north by both these provinces, Quebec and Ontario. General vaccination was applied and the roads and railroads to Montreal carefully guarded. In that year there were just 3 cases of small-pox in Maine, 2 of which had been infected in Canada and in whom vaccination came too late.

I relate this epidemic in Montreal long ago because it is an epidemic, not because it is an epidemic of small-pox. We are not likely to see a large epidemic of small-pox in our cities while vaccination is generally practised, because there are a large number of protected persons who act as an insulating wall, so that the case which arises in an unprotected person will not be liable to spread the infection far. But if it were not for general vaccination, unvaccinated persons, who are always a danger to the community, would bring back the terrible scourge which killed its thousands every year and disfigured so many of its survivors that Dr. Johnson wrote this "epigram to the small-pox":

"Envious and foul disease, could there not be  
One beauty in an age, and free from thee?"

I have cited this epidemic because it shows much more graphically than any abstract discussion of the subject can do, and better than any other epidemic I have run across, the measures



necessary to prevent on the one hand and on the other to encourage an epidemic. And the principles are the same in the case of the less deadly diseases, measles, scarlet fever and diphtheria. Indeed, it is much more difficult to stamp out scarlet fever and diphtheria, because small-pox patients when they are attacked are decidedly sick, and when they get well are absolutely well and do not go about for weeks or months distributing the disease, as do the so-called carriers of diphtheria and scarlet fever. It took six years to eradicate diphtheria from the Willard State Hospital for the Insane, although from the first the hospital was under careful control.

The manner of transmission of measles, scarlet fever, diphtheria and whooping-cough is in the great majority of cases by direct contact with a person who has the disease or with a person who carries the infectious material, he himself not being manifestly sick. This infectious material resides chiefly in the secretions of the mouth, nose and throat. It may also be present in the excreta and in the discharge from ears or broken down glands. It may also reside in the desquamated skin, though to the modern medical mind the danger here, while it cannot be disproved, is not feared in anything like the degree that it was formerly. The child with the beginning cold in the head of measles may go around coughing the deep, barking cough which most of you know, and sneezing when he does not cough. Projected by each cough or sneeze are millions of tiny droplets of vapor carrying the virus of infection, floating in the air for considerable time and reaching considerable distance. It used to be said at the New York Foundling Hospital by one of the good Sisters there, that a child who was coming down with measles need but sneeze or cough once in order to infect the whole ward in which he happened to be. That this is but slightly if at all exaggerated is shown by the origin of an epidemic in Scotland in 1906.

On December 26th two children in a little country school had colds. They were not withdrawn from attendance and the school closed on the 29th for the New Year holidays. On that day these children first showed a measles rash. From that time there was no contact by anyone with these children, but nevertheless between the 9th and 12th of January, 21 out of 44 children who were susceptible had come down with measles.

Whooping-cough is transmitted in the same manner as is



measles and with nearly the same ease. It is, moreover, in the earliest stage of the disease when the characteristic whoop has not developed that its infectivity is at its height.

The infectiousness of chicken-pox, which is only in the rarest instances of any great severity and which is a disease that could be disregarded if any disease should be, is quite as great as that of measles, but we are not certain how it is propagated, although so long as scabs remain on the skin, the danger seems to persist.

Scarlet fever, on the other hand, needs much closer contact than measles, and so does diphtheria, but both may be transmitted without actual bodily contact. They may also be transferred, if the contamination be recent, by means of infected utensils, clothing, toys, books or other things. The virus does not last long in the presence of light and air, and cases reported as occurring months or years after the last known case in a community and believed to be due to the child wearing some article of clothing which had escaped disinfection are usually found when a complete investigation has been made to have other and more immediate cause.

The story is told of a New York family in which one child had diphtheria. The other children were sent south. Some time after, when the first child had recovered, the children down south took the disease. It was found that the medium of transmission was a woolly dog which after playing with the child in New York had been sent south to the other children. It is also related that a young woman who had recently had diphtheria and was apparently quite recovered, upon making a call at the house of a friend who had a child, deposited her chewing gum on the under side of her chair, doubtless intending to regain it surreptitiously later. She did not, however, but the child did, with the result that another case of diphtheria was recorded at the office of the Department of Health. I am afraid that this might not be substantiated, but it is essentially true, and leads us to the consideration of what is known as the "return case" and to "carriers."

"Return cases" of which we hear most in regard to scarlet fever, are illustrated by the following: A child in this city (and she is but the type of thousands) had been ill with scarlet fever during which she had a bad throat, enlarged glands and a discharging ear. After five weeks of isolation, during which she desquamated to everyone's satisfaction, she was released from

quarantine, and the apartment was fumigated. With her car still discharging, she rejoined her family and went down to the street among other children. In a day or two her brother had scarlet fever, and a little girl in the same house who had played with her for only a few minutes also took it. Such cases have been reported as occurring as late as after eight months of quarantine where children have had enlarged glands or discharging ears or nose.

The "carrier" is the apparently well person who has diphtheria germs in his throat, who has a mild scarlatinal sore throat, or an unnoticed scarlatiniform rash and who goes about his daily walk of life spreading infection. He is far more dangerous than a frank case of illness, and it is believed to be due to the carriers that scarlet fever and diphtheria are kept alive to break out from time to time in epidemic form. In the Willard epidemic, two clerks who lived in a building newly built, and never occupied by any diphtheria case, and who themselves had never seen a case of diphtheria, contracted the disease. It was found upon investigation that they played cards nightly with the night watchman and drank from the same water pitcher that he did. He was found to have the diphtheria bacillus in his throat which he had probably acquired from his son-in-law who at that time had diphtheria.

In addition to personal contact with cases of disease, and with carriers, food, especially milk, has been known to be the source of distribution of both diphtheria and scarlet fever, and well authenticated epidemics arising from this source have been reported in considerable numbers. The milk may be contaminated by the milker, or by the cow, or it may be that the milk cans have been washed with contaminated water, or wiped with unclean cloths. Wherever lack of care in the disposal of excrementitious products, or nasal or throat secretions exists, and lack of care in controlling the sick, the recovered and the carriers, these diseases may arise.

I think you will see from this somewhat cursory survey of the problem presented by the commoner contagious diseases that the problem of prevention starts from the first case of the disease and deals with (1) care of the patient; (2) the persons exposed to the disease; (3) the susceptible unexposed persons; (4) the carriers.

Any person suffering from one of these diseases is poten-

tially the starting point for an epidemic. He must, therefore, be isolated. Isolation from our present point of view is not concerned with getting him well, although we hope it may do so; but with preventing his distributing his affection throughout the community. He must be isolated then from contact with susceptible persons. Those who take care of him should be immune to the disease. This is not always possible, but as adults are not likely to contract measles, scarlet fever or whooping-cough to any great extent, and may be immunized against diphtheria and small-pox, the conditions are likely to be carried out. The rooms in which the sick person is isolated are better such that fresh air and sunlight may enter, for they are themselves antagonistic to the life of infection. Draperies, pictures, rugs, etc., should be removed, and the furniture should be such that it can be cleaned with disinfectant solutions or can be steam disinfected or can be burned. All utensils which are to be used in the care of the sick person should be peculiar to him and not removed from the sick room. Especially is this necessary with eating utensils, sputum cups and the like which come into contact with the secretions of the mouth, throat and nose where we know the greatest infectivity lies.

The utmost care should be taken with the disposal of these secretions. Expectoration should be into pieces of cloth or into sputum cups and these should be burned. The bed clothes should be changed and disinfected frequently, and the floor area around the bed should be cleansed with disinfecting solutions. The visible desquamation may be minimized by frequent inunction with mild antiseptic ointments. The excreta may be disinfected by admixture with disinfectant solutions or better by boiling.

Persons entering the sick room, and they should be as few as possible, should wear some clean garment over their clothing, refrain from touching the patient unnecessarily and on leaving should remove the protective garment and disinfect their hands. Nurses of such cases should regard themselves as potential carriers and should be isolated with the sick.

It is only by observing consistently some such rules as these that the condition can be reached whereby no infectious material shall come from the sick child to susceptible children.

The duration of such isolation will differ with the case and with the disease. As this is a medical point about which much



might be said, I shall not touch upon it except that for our theoretical consideration it shall be long enough to insure a condition of non-infectivity upon the part of the sick person.

Then comes the matter of disinfection of the premises. This, too, is a long subject. It should be thoroughly done, and if you care to know how to do it, I recommend that you read the chapter on disinfection in "The Prevention of Infectious Diseases," by Dr. Alvah H. Doty, late health officer of the port of New York, than whom no better authority can be found.

We next have to consider the "contacts" so called, the persons who were exposed to the sick person before his isolation. Of course we shall all agree that no susceptible person who has been exposed to such a disease should be allowed to develop the disease and to infect others, but I wonder how many of you would countenance the excluding from school of your exposed children because a case of measles had developed in their classes. Still these contacts must be regarded as the next most dangerous point for the spread of these diseases, and I for one would welcome some method by which they could be perfectly supervised until the period of incubation had passed. As things are now, teachers and pupils living in an apartment where there is measles, scarlet fever or diphtheria are excluded from school attendance. This is perhaps of doubtful benefit, for with our present admirable methods of school inspection, the development of disease in such contact cases is much more likely to be detected when the children go to school than when they run about the streets with no medical supervision whatever. The control of such children is still an unsolved problem, but solved it should be. It is theoretically and practically wrong to allow a number of children who may be at any time active centers for the propagation of disease to pass freely among their fellows. An awakened and unselfish public spirit may solve this for the doctors. At any rate, when a case of contagion develops in a hospital all contacts should be detained and the ward quarantined until the danger is entirely over.

The third class of persons to be considered are the susceptible children who have not yet been exposed to contagion in the person of our original case but who may be exposed to its contacts or to other cases of illness. They must be kept away from children already sick. This is what the placards of the Department of Health which are pasted on doors to the distress of apart-



ment house dwellers are for. Everyone should realize that it is not to annoy that these signs are placed there, but to warn people to avoid infection. It is a sad commentary on the selfishness of individuals that people fight this so and beg their physicians not to report cases to the Department and try to use political influence to avoid the placarding of their doors. One mother told her physician that she would never have called him had she known that he would report the case, and yet one can readily believe that had someone else, in the next apartment to her own perhaps, done likewise, her anger would have known no bounds. Quarantine is a burden, but you must remember that it is also a public necessity and the reason for placarding is to warn the as yet uninfected susceptible child away from a source of possible infection.

These children should also be protected from the child who has been released from quarantine if he present discharging nose or ear or enlarged glands, for we have seen that it is from such children that return cases arise.

And here the matter of whooping-cough deserves especial attention. Whooping-cough becomes so widespread because people think it is of no importance and because it is not quarantined. In our parks and all places where children play, there are many children going about with the disease. Now fresh air is one of the best cures for whooping-cough, but such children should not be allowed to go about among other children and they should be labelled, so that other children can keep a good distance away. It has been suggested that they wear a ribbon of a distinctive color with W. C. on it on one shoulder to let all people know at a glance to avoid them. I think that this is an excellent idea. Whooping-cough kills more babies under one year than any other contagious disease. It should have more attention than it has heretofore had. Hospitals are sadly needed for the reception of whooping-cough cases. As it is now the child with whooping-cough is a pariah and if he develops pneumonia and his parents cannot afford private medical attention, he has no chance to get proper care. He is a fertile field for the sowing of tuberculosis.

I have indicated that food supplies should be protected from contamination as a part of the effort toward the protection of the susceptible individual. We have time to but mention it in this connection.

There are matters of prophylaxis concerning the person of the susceptible individual which may need attention in the attempt to prevent his infection. The diseases under consideration are primarily affections of the upper respiratory tract. Here the presence of adenoids or enlarged tonsils decidedly increases the chance of contagion. It is good preventive medicine and good economy to have these diseased conditions attended to. It may mean the difference between a mild illness and one which kills or maims permanently.

Finally we have as a matter of protection to the community the detection and isolation of "carriers." This is so essentially a medical task that I shall not enlarge upon it here, but indicate it merely as one of the most important tasks in the whole problem. Everyone, doctors, nurses, parents alike, who come into contact with disease should regard themselves as potential conveyors of the disease through their bodies or their clothing and exercise the greatest care in avoiding contamination and in disinfecting themselves if contaminated.

I hope that you will take home with you the facts that these diseases are prevalent yearly to the number of over 80,000 in this city; that they cause over 4,000 deaths a year; that they cost large sums of money and incalculable time, worry, suffering and grief; that they have been somewhat curbed, thanks to compulsory notification of cases and the persistent work of the Division of Contagious Diseases of the Department of Health and that they may be still further reduced.

I hope that you will realize the necessity of your earnest co-operation with the Department of Health in all its preventive work. Some of the regulations in the circulars of information may sometimes seem stringent to some of you personally. I hope I may have helped you to appreciate that they are not only to protect others from you but to protect you from others.

We live in a large community and more and more does that word deserve its meaning as we realize that we have common interests and common duties with every other member of the community. I think you will agree that in no other common enterprise is there more of benefit to be obtained for each member than in the effort for the prevention of communicable diseases, of which the prevention of contagious disease is a part.

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## THE DUTY OF THE COMMUNITY TO ITS BACKWARD AND DEFECTIVE CHILDREN.\*

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The children for whom I desire to enlist your interest and coöperation belong to a different class from the other types of child-life you are to hear about today, though they may have many points in common, and may be subjects of any or all of the contagious diseases, and they most certainly need an outdoor life, but still they are separate and distinct from the normal child. In a large degree they may be considered as victims.

The backward child belongs in the main to the more hopeful class of subnormal children, and with such hygienic and preventive care as you have learned about today, these children have a fighting chance to amount to something in mature life. Parent, physician and teacher are bending every energy to help these children, therefore they do not need to enlist our special attention and I will devote my brief period to the needs of a class of defectives which are little known to the general public and who are seldom spoken of in your club meetings or in your other activities for the betterment of mankind.

There are varying degrees and kinds of subnormal children—the deaf, the blind, the crippled child all come under this classification, but the kind of defect which is the most hopeless, and the most menacing to the public welfare, is that of mental defect, and any consideration of this class of children must become a plea for rational, practical eugenics, which deals with concrete humanity rather than abstract considerations, and by that study of heredity whereby we shall learn to understand the individual, and the causes which act and react upon his mental well-being.

As a rule, and with few exceptions, the child of defective mentality is born so, and it is with those who are defective from birth that I specifically desire to deal. If a child is born with a serious mental defect we at once turn to his heredity to help establish the accurate cause—for on that very largely depends his chance of future help. A conservative estimate of the approxi-

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mate number of mental defectives is given by nearly all who have made a special study of this type of subnormal, as 1 per cent. of the child population of a country, or state, or city, or, as one writer expressed it, "the mentally dull child is the one-hundredth child." Here in New York City we are within very conservative limits in such a statement—we have at least that number. In our city we have over 700,000 children in the elementary public schools, and 1 per cent. of this number means that there are now more than 7,000 boys and girls in our school population who have defective mentality—children not merely backward—if the number of these cases was included we would have a very much higher total—but those having a definite mental defect; some present few symptoms, and to the lay observer might not seem to be in a serious condition; others are so obviously unbalanced and present so many objective symptoms that the most casual observer would be able to single them out, and between these extremes are to be found every varying degree of mental inefficiency.

For a long time—many years in fact—these unfortunate boys and girls have been the bane of the classroom, always left back, always reflecting discredit on themselves and on their teachers, for at promotion time that school machinery runs smoothest and that teacher is most to be congratulated whose percentage of promotion registers 100. The teacher who has a hold back for several terms needs to be investigated. During the past six or seven years, however, it has been demonstrated that the teacher is not wholly to blame for these left-backs; that there is something radically wrong with a child who is always falling behind; that nine times out of ten the child has come into the world most seriously handicapped; and in very many cases the blame, if placed where it rightly belongs, should be laid on the shoulders of its parents or, possibly, its grandparents. To quote a kindly principal of one of the Brooklyn schools, "the child has chosen its parents very unwisely." Heredity plays a very important part, and a very big part, as a cause of very many of the true mental defects of childhood. True, such a disease as epilepsy is often, though not always, due to bad heredity; but spinal meningitis, scarlet fever, and some other diseases are not due to heredity, and yet they leave direful sequelæ in their wake, but in such cases we can gain the definite history of the disease.



However, by far the greater number of children who are defective are so because of other hereditary causes. Alcohol, in one or both parents, is a pertinent cause of mental deficiency. It has been definitely demonstrated that the effect of a dose of alcohol can be readily traced in the mother's milk within twenty minutes of its entry into her stomach, and may be detected in it for as long as eight hours after a large dose. "Many cases are on record where infants at the breast have thus become the subjects of both acute and chronic alcoholic poisoning." "Alcohol can readily be demonstrated in a newborn child when the drug has been given to the mother just before its birth." "It has been shown that the effect of alcohol upon the brain persists for not less than thirty hours after the last dose." What wonder then that a child, conceived when one or both parents have become victims of the tippling habit, or worse, should show signs of mental instability and run the gamut of mental defect from one extreme to the other?

Then there are the results of the two scourges of humanity—gonorrhea and syphilis. Very many of the most pathetic cases of idiocy and imbecility may be traced directly or indirectly to these dread diseases. I cannot go at length into the causation of this condition of defect—much as I should like to do so—a time limit bids me hasten on, and I have only mentioned a few of the most obvious causative factors. I do want to lay much stress on the fact that heredity plays a vast part in the production of the majority of mental weaklings, for on the appreciation of this fact much depends, and if I leave no other truth than this before you to-day I will have accomplished something.

With such a mental condition, and presumably with such heredity, should a mentally defective person marry? Surely your reply would be an unqualified No! Absolutely NO, for this would be carrying the wrong to other innocents far down the line unto remote generations. And yet this, and worse, is what is happening every month of every year. Such persons, provided, of course, that they are not of the lowest degrees of defect, can obtain a marriage license at the marriage bureau in our city at any time. There are several cases whom I have examined more than once—cases who have been committed to a protectory for having broken the law, though their crime was committed because they had not sufficient mentality to understand that they were doing wrong, and who have been in these places of deten-

tion for as long a period as two years, and who could never become normal, and who are on the records of our schools as mental defectives—have been able to secure a marriage license. What can the result be? Practically only one thing—the production of more children of defective mentality of perhaps a worse degree than the parents. I call to mind the case of a young girl under the age limit who secured the right to become a wife, and was abandoned, though pregnant, by the man she married in two months' time. This girl had been an inmate of a protectory for a long period, and had been a pupil in one of the ungraded classes of the city for several terms, but at the present moment she is adrift and it would be a matter of small wonder if she were not living a life of shame. Who is to blame for this? You and I rightfully should shoulder some of it; her parents were ignorant Italians of very inferior mentality; they are not wholly responsible. Where are our tax-payers; where are our voters that such lax laws are allowed to remain on our statute books; or where are we, you and I and many like us, that we are not waging war against the legal propagation of the unfit?

• Very many of the cases which come up for special medical examination in this city are immigrant children or children of immigrant parents. I am informed that very recently the authorities at Ellis Island have devised a scheme of reporting the name, age, etc., of each new immigrant child entering our port to one of the superintendents of the Department of Education—a very good thing, a step in the right direction; but by no means is this enough. The subnormal among these children—the defectives—will cost the city and state a lot of money in one way or another, and the plan which will mean the least expenditure in the long run would be to provide an alienist, with a *sufficient* (please note the emphasis on the word) corps of medical assistants who will examine into the mental status of every child or every parent who is in the least degree a suspect, and exclude all defectives who are likely to become a public charge; and perhaps we might go a step nearer the solution of this phase of our problem by having this examination made at the port of departure instead of that of arrival, and thus save them and ourselves much trouble and unnecessary expense. I recall the case of a boy of perhaps eight to ten years of age. His father had come to the United States when the lad was an infant and the mother had followed when he was five years old, and they and

their friends had made repeated attempts to get the child into the country, but he was of such apparently low grade mentality that he was refused a passage by the steamship companies—or that is how the matter was explained to me. Finally, however, he was brought over as their own child by friends of the family, who were emigrating to New York, but I believe he came in via Canada and thence to this city. A month after his arrival he was brought to me for a special medical examination, in order to determine where he should be placed. He had been admitted to one of our East Side schools, but had acted more like an animal than a human being; he would grovel on the floor, making grunting noises akin to the sounds which animals are wont to make; he could not attend to his personal needs in any way, and even though spoken to in his native tongue never responded or seemed to heed or to understand what was said to him. Very plainly the only place for him was a state institution, but he had not, at that time, been here long enough to be admitted, and he was of too low grade to be allowed to remain in any public school. He was never deported, and is without doubt a charge on our state at the present time. If our government had had some qualified physician to examine into the mental and physical status of all emigrants at the port of departure, and to report the names, age, sex, and all other necessary data promptly to our authorities here at our ports of entry, such cases could not gain entrance. Surely it is not our duty to care for such afflicted persons of foreign birth. The government of their own country should care for them, and our country should not be called upon to bear such unnecessary and additional expense for a class of most undesirable persons.

There is another side to the problem of mental deficiency which is seldom dwelt upon, *i.e.*, the prostitution of girls and women of feeble mentality. This is going on wherever such persons are to be found. Unfortunately we have not, as yet, had any very thorough or exhausting study as to the proportion of the total number of prostitutes, in any of our working houses or institutions, who have been pronounced feeble-minded, though I understand that a most admirable plan is under way for such an investigation to be made at the Hudson Institution. The most recent statement which has come to me was to the effect that of the total number of prostitutes arrested, taken to one of the night courts and placed on probation, and who were sub-



jected to a physical and psychical examination, 90 per cent. of these women (some were very young offenders), were pronounced, by able and competent authority, to be mentally defective. In England, Scotland and Wales they have been giving attention to this phase of the problem for some years past, and Dr. Tredgold states positively that "the sexual instinct in the feeble-minded, especially in those suffering with some of the middle degrees of defect, is often inordinately developed." He also says, "As bearing upon the questions of propagation and the social relationship of the ament, I may cite the following cases which have recently come within my experience:

Upon the edge of a moor, in a thinly inhabited part of the west country, stands a filthy thatched wooden hovel consisting of two rooms. Its exterior has an air of utter desolation and neglect; its interior is in a state of indescribable dirt and confusion. It is occupied by a married couple and their family. The man, aged fifty years, is of a decidedly low animal type, and has considerable moral, as well as slight mental defect. He never refuses a drink, and picks up a living by occasional osier-stripping, and doing odd jobs on farms, but chiefly, I think, by poaching. The woman, his wife, is forty-four years of age and feeble-minded. She seems to be busy most of the day and in her way keeps the house going; but she is utterly lacking in any capacity for management, and the filth and disorder are extreme. This woman had three children before marriage, and nine since. Of the former three, one died young of consumption, a second has entirely disappeared, and the third lives about the neighborhood. Of the nine born in wedlock, two died in infancy, three attend the village school and are mentally defective, and another, also mentally defective, is at home. The eldest does odd jobs with his father, and seems to be able to take care of himself. The remaining two are aged five months and three years respectively, and are too young to enable an opinion to be formed as to their mental capacity. To this it may be added that the father has had ten children by a previous wife. Of these, two are feeble-minded, one of them is living a life of prostitution and has already had two illegitimate children in the workhouse. The others have been entirely lost sight of.

Mary H. is a feeble-minded married woman forty years of age. She lives with her husband, a farm laborer, in a small cottage in an isolated village. She is industrious and always work-



ing, but the house is in a disgraceful muddle. At my visit there were two unwashed, partially dressed children, under three years of age, sprawling about the wet stone floor amid a litter of dirty plates and pans, potato peelings and live poultry. Upon asking her how old she was, and how long she had been married, she replied, with a fatuous smile, that she didn't know, but her mother did. The children I saw in the house were too young to examine mentally; but two other illegitimate children whom I did see, aged sixteen and seventeen years respectively, were feeble-minded. Both of these are industrious boys, and work well under supervision, but they are quite incapable of looking after their affairs. This woman has two brothers, who are also feeble-minded; one is constantly in and out of the workhouse, but the other, aged thirty, is employed regularly with a farmer at the rate of a shilling a day. Their mother has had several attacks of insanity, but the father is dead, and no particulars were obtainable regarding him.

Rose D. is a feeble-minded woman forty-five years of age. She is the daughter of a well-to-do farmer, but ran away from home at the age of twenty years, and since then she has been living a life of prostitution. Her usual abode is the common lodging-house, but a considerable part of her life has been spent in prison, the workhouse, and various charitable homes. She has been confined of three illegitimate children in the workhouse. The clergyman of the parish in which she lives says that he has got her into homes again and again, but she will not stay, and they cannot compel her to do so. All attempts to induce her to lead a respectable life have failed, and she is his despair and a disgrace to the civilization which permits her to be at large.

I may add that these are by no means isolated instances. Many of the particulars regarding this matter which have come under my own notice are too revolting for publication, and there is the clearest evidence that the propagation by aments is both a terrible and extensive evil."

Our American courts are constantly trying criminals who, without the least doubt, belong to the army of the feeble-minded. A very notable example of "the inordinate sexual development" is to be recalled in the person of young Wolter, who murdered a young girl of unblemished character about two years ago. You may one and all recall the findings in his case as they came up at the trial, as well as some of the statements concerning his heredity.

To those interested in eugenics, the most pertinent but harrowing record of a family, noted in the annals of crime and deficiency in the State of New York, presents many problems for serious thought. "The Jukes," the descendants of one defective couple, are traced through five generations until the number reaches 1,200; 709 of whom lived, and throughout the entire history of this family only a very few were found to be honest, even approaching normal mentality; while the vast majority were found to be vagabonds, paupers, criminals and prostitutes. This family of progeny, in seventy-five years, cost the State of New York over a million and a quarter dollars, without any computation of the cash paid for whiskey, or taking into account the entailment of pauperism and crime of the survivors in succeeding generations, and the incurable disease, idiocy and insanity growing out of their debauchery, and reaching further than we can calculate. In view of such a state of affairs that policy which fails to make ample provision for the segregation of all girls and women who are mentally defective is one to be censured very strenuously. To use an old-time expression, it may be said to be "penny-wise and pound-foolish."

Dr. W. E. Fernald may be quoted in this connection; he has said that "feeble-minded women are sources of debauchery and licentiousness which pollute the lives of boys and youth of the community, disseminate disease and bring young children into the world destined to repeat their history." Before leaving this phase of the problem I wish to quote from the histories of some of the cases coming directly under my notice.

CASE I.—Jennie E., a girl of eighteen years, is a low grade imbecile. Her parents are Russian Jews. The family of five live on \$7 a week in three poor rooms. Jennie is utterly incapable of doing housework or anything else. She was for several terms in an ungraded class; but she was unable to learn anything. She cannot write her name, nor can she copy letters that are made for her, nor count the strokes of a pencil up to five. Her mother wants her at home, but would consent to having the girl sent to an institution in order to get rid of the constant nervous strain of her presence. She would, however, prefer to have the girl marry. The girl is in the habit of meeting in Seward Park the feeble-minded boys whom she has known.

CASE II.—A girl of fourteen years is decidedly feeble-minded and immoral. Her father and mother are cousins. They

have had eleven children, not one of whom is normal. A sister is insane; another sister, feeble-minded, is on Randall's Island; a brother, also feeble-minded, has been in the House of Refuge. When this girl was eleven years old she was in the City Hospital on Ward's Island with venereal disease; she can do some work, if under constant supervision, but she is very erratic and destructive.

CASE III.—Fannie L. is a native born girl and an imbecile. Her father and her mother are both alcoholic; her brother has defective hearing; one sister is a degenerate; another sister is feeble-minded. She herself is ill-nourished, ill-clad and neglected. Her movements are all very inco-ordinate. When left in care of the baby she feeds it with anything it will swallow. This family is dependent on charity for subsistence. Why cannot charity use discretion in such a case and place such dependents where they rightfully belong?

CASE IV.—A boy, eight years old, American born, of Dutch parentage. A congenital feeble-minded case. His speech is defective and he is also a neurotic. He must be cared for like a baby. He was on Randall's Island from November, 1909, to January, 1910. His parents were dissatisfied with his treatment and withdrew him. Why is not the public dissatisfied with the action of these parents who have brought out into their midst a menace to the public weal?

CASE V.—Silas M. This lad is one of the most pathetic cases with whom I have come in touch. He was about fifteen years old when I first saw him. He is American born; his father was a German and his mother a Swede, and his home is comfortable. His father had syphilis, was a morphine habitué and went insane and finally committed suicide. His mother is somewhat abnormal, neurotic, and very much out of sympathy with the boy, for whom she fails to provide the proper sort of care. One of his sisters is an epileptic, and Silas also suffers from epileptic seizures of the grand mal type. When a child he had meningitis, and when five years old he fell and struck his head and was unconscious for some time. He is decidedly feeble-minded, often sullen, and at times very violent and uses very bad language. Besides all this he is a chronic vagrant. About two years ago he was committed to Craig Colony, but after a few months he ran away in one of his moments of excitement. After some weeks of very difficult searching he was found. His family could



ill afford to pay for the search, but the mother was so alarmed she was willing to do anything in her power to locate him. He has been twice on Randall's Island; once he was withdrawn by the mother, through very unsound advice given her, but the second time he was sent to Craig Colony. The authorities there feel that they can do nothing further for him, and they claim that sending him to Sonyea will only result in a repetition of the former experience. The future looks very hopeless for this boy, about the only thing to expect is a life of criminality for him, unless he can be placed where he will receive the proper training and supervision. His presence in the home is a continual source of worry to his mother, and it is slowly but surely undermining the vitality of both his mother and sisters, and their antagonism and the utter lack of sympathy of his surroundings are aggravating the boy's condition. Repeatedly has he run away from home and usually, after days and weeks spent in search for him, he has been found in a filthy, unkempt condition in some stable, in company with men unfit mentally or morally to care for him. His passionate fondness for horses nearly always leads him to a stable, or to a farm where he can have an opportunity of getting close to these animals.

CASE VI.—Philip Z. In 1906 a school principal wrote to a member of the Child Labor Committee asking assistance in the case of a feeble-minded boy. Her letter in part is as follows, which I quote from the special report of the feeble-minded in New York, issued by the Charities Organization:

"Although fifteen, he cannot go to work, because he can produce no proof of age, and cannot meet the scholastic requirements. He will never be able to do either as long as he lives. He is a defective of the very lowest type and is subject to attacks which are almost insanity, and are sometimes accompanied by violence. After a year of hard work and patient teaching, Miss — reports that he can barely write his name; can make change if he has money, but cannot perform the necessary process if he has no money. Can sometimes read in a primer, but not always even that.

"Not one of the family is normal. The best we could discover of the father was that he was sent to the insane asylum on Ward's Island. The mother is almost idiotic, and is living with a man to whom she is not married. There is a baby almost ten months old, but whether it is this man's child or not I cannot



find out. This man has precipitated the present difficulty by putting Philip out of the house, saying that a boy of his age and size must go to work. Where Philip is now we do not know, although he has been seen on the streets at night. Of course we can get him back to school eventually, but the question is, what shall we do with him and for him when we get him?

"I can see only three possible solutions, with grave difficulties in the way of each. They are:

"(1) To let him go to work, since he is physically able to earn enough to support himself. The objections, present and future, to this are obvious.

"(2) To give him a scholarship until he is sixteen. That will only postpone the final settlement of his case, however.

"(3) To confine him in the home for children of his type in Randall's Island. That means a tedious process, in the course of which the boy is almost sure to disappear, especially as he is not lacking in a certain street shrewdness, and views every new person he meets with suspicion. He ran out of school screaming madly, one day last spring, and was gone for days, because a chance visitor spoke to him.

"Our information has been obtained from neighbors, by visits to the home made by Miss — and the school doctor. In the course of the year we have clothed him and fed him a great part of the time, and have sent baskets of provisions to the family several times when we found them in dire need. Of course we cannot keep this up. There are too many other calls, and I feel that the time has come for decisive action."

This boy has since secured a marriage license and is now married!

There has been a very strong difference of opinion among the Boards of Education in some of our cities, and some of the best of educators. Naturally the one looks entirely to curtailing present expense, while the other, believing that every child born should be given as much of an opportunity for self-betterment and protection as possible, is actuated by a higher motive than curtailing the school budget by the cost of a few teachers or the special equipment of some additional class rooms where the mental derelicts may have some chance for bodily improvement, and where we may get positive data concerning them and their homes, which may be of vital service a little later when the public conscience has awakened sufficiently to recognize the enormity of the

problem before it and devise some means whereby it can cope with this monster.

After thus considering the child of defective mentality we may sum up the duty of the community to be

1. The gaining of personal information concerning the approximate number of aments in city, county, state.

2. To endeavor to use present laws in so far as they cover the problem, and

3. To seek to obtain further legislation which will more effectually deal with the needs in caring for these afflicted children.

4. To demand that it shall be unlawful to issue a marriage permit to any person or persons who have at any time been declared to be mentally defective, or, when such evidence does not exist, and there is any doubt about the mental habits of either of the contracting parties, a certificate of mental fitness to be produced from a reputable physician in good standing. For, as Dr. Barr recently said, "it is a poor rule that does not work both ways. Those ancestor-worshippers so eager to vaunt the excellencies of their forbears should be impelled to legislation preserving the purity of the race by a mere sense of *noblesse oblige*."

The Charity Organization of London, a few years ago, made a very pertinent plea, which I quote as expressing most fully my own sentiments: "We would bring to their assistance in childhood and in later life a new and more discerning charity. Taking into account the peculiar difficulties and dangers which surround the lives of these weaker fellow-citizens, we would, on their behalf, ask for an education adapted to their needs, and, when necessary, a kindly and voluntary custody, such as science suggests and charity can, if it will, effect. *We would educate and train them for the possibilities of their own life*, as those endowed with better faculties and happier fortunes may be taught and trained to draw what is best out of the life which lies before them. We would ask for the support of local or State authorities, but only in order that the acknowledged duties toward the afflicted should be better fulfilled; and *we would provide for the feeble-minded, after childhood*, not in workhouses, but, *as far as possible, in homes*, where, under friendly supervision, but *with the safeguard of official inspection*, they may be maintained by the public bodies, whose wards in some sense they are, or by the private person who would find for them some quiet resting

place where they may work and find enjoyment within that narrow range of thought and exertion in which, without anxiety, they may be content and happy," and I would add, that *under no circumstances they be allowed to reproduce their kind.*

101 West Eightieth Street, New York City.

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#### EPILEPSY IN CHILDREN AND ITS TREATMENT WITH BROMIDE.

Paul Boncour (*Prog. méd.*, March 19, 1910) thinks that, although the bromide treatment is the best for epilepsy, its success depends greatly on the method of administration and the attention given to the details of diet and hygiene. It is indicated in all cases in which convulsions are present and should stop all motor phenomena, but in cases of petit mal, without any convulsive movements and of mere dizziness, it is less successful. The cause of the attacks should be carefully sought out and as far as possible removed. A daily history card kept by the parents is a great aid to the physicians in the knowledge of the number and type of convulsions, and thus of the effect of bromides. The bromide must be given in sufficient quantity and for a sufficiently long time, generally for several years. The author prefers a mixture of the three bromides, sodium, potassium and ammonium, to which he adds in some cases calcium bromide. The dose must be carried up to a point at which the motor manifestations are controlled without marked bromism, and must then be kept at that point for months or years. Irregularity and lowering of the dose without permission is responsible for most of the failures. A great aid to the effect of the treatment is given by restricting the amount of chloride of sodium that is used with the food to a small quantity. The bromide is then effective in smaller doses. It should be continued three years after the last attack.—*American Journal of Obstetrics.*

## OUTDOOR LIFE FOR CITY CHILDREN.\*

BY WALTER LESTER CARR, M.D.,

New York.

For many years parents and teachers have considered the mental equipment of children but have overlooked the necessity for physical development. Latterly, however, there has come to be an appreciation of the need for babies and children to have an open air life as an essential foundation for future physical and mental stability.

A century ago the cities of a population of 8,000 or over represented only 3.3 per cent. of the total population of this country. It is calculated that at the present time 33.3 per cent. of the whole population lives in cities, and with this added percentage of city dwellers the cities are larger and much of the simplicity of former years has passed away.

As the size of this city increases the limitations of out-of-door life, both for infants and children, are greater. The municipality has provided parks and playgrounds and the Departments of Education and of Docks have endeavored to solve some of the problems incident to overcrowding in the tenement districts. Public and private hospitals, and charitable institutions have given the subject of open air life, for children and adults, considerable thought, not only in the treatment of disease, but also with the desire to increase the strength and vitality of those who are below the mark in physical development.

The home environment of most of the children who have the use of parks, playgrounds and docks is such as to minimize the good results that should come from the time spent in the open air because of the restricted area of sleeping and living rooms. To benefit this class of our population we must not cease in our endeavors to improve tenement houses, schools and factories, and we must be alert, lest selfish interests destroy the advances that have been made.

The problem before us does not directly concern the children of the very poor, whose cause has been so ably presented by playground and kindergarten associations and by many other

\* Prepared at the request of and read under the auspices of the Public Health Education Committee of the Medical Society of the County of New York at the New York Academy of Medicine, February 15, 1912.



organizations, but it deals with the children of the comparatively well-to-do classes, whose parents, by reason of business or social life, are kept in the city. These children have many opportunities for life in the open air which they are not allowed to enjoy because of mistaken views of architects, decorators, nurses and unfortunately those whose judgment should directly control them—namely, the parents themselves.

Architects may not be given free scope in building a house and a nursery is not always arranged so as to secure the maxi-



FIG. 1.—Roof on extension arranged for small children.

imum of fresh air and sunshine, while a roof playground is seldom planned for.

A nursery should be chosen with reference to sunlight, but in a city house or apartment this may be difficult. Babies and growing children require air space, and even if the room is not very sunny arrangements can be made by which fresh air may be secured. An open window and an open fire are of great advantage for ventilation. A window board four inches wide may be used, but no hangings nor draperies should be allowed to interfere with the free entrance and circulation of air. No unnecessary ornaments should be placed in the room.

Nurses, even those who are not old and infirm, often object to an open air nursery, and if they are cold they at once assume that fresh air is "bad" for the child. Parents frequently coincide in this and the child has no opportunity to be out of doors. If a

child's body is exposed to the cold air when it is not exercising there is loss of body heat and a child who sleeps in the open air must have the body well covered. Cold air does not enter the lungs, but it is warmed as it passes over the mucous membrane of the nose and throat and enters the lungs warm. Many of the supposed dangers of "cold" disappear when the mucous membrane of the nose and throat is kept healthy and adenoids and tonsils receive proper attention.

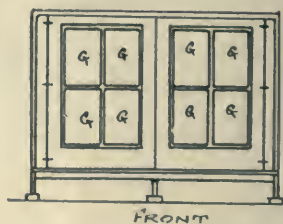
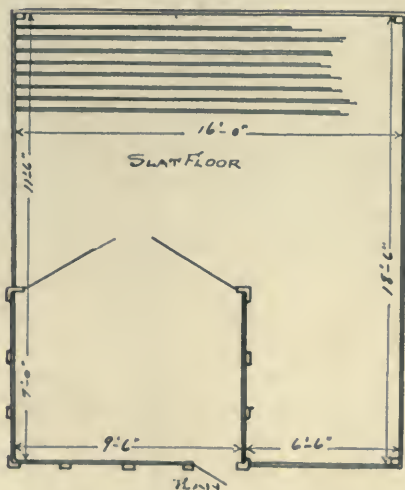
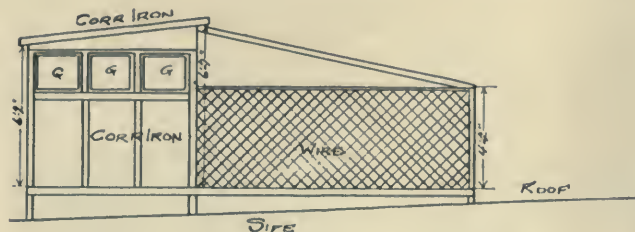
For all children who are to sleep in the open air a sleeping bag or a folded blanket fastened at the lower end and sides with heavy safety pins such as are used for horse blankets, or with large buttons and buttonholes, is more convenient than to attempt to roll the child in a blanket or to tie it in bed. If there is an open porch, fire escape or roof that is accessible, it should be utilized for a sleeping place. In stormy weather a large umbrella or a small tent of canvas or a rubber blanket can be arranged on a frame to protect the child. Canvas window tents are serviceable when there is no available porch or roof. Figures 1 and 3 and 4 show arrangements for out-of-door sleeping.

The question of open air life for city babies and young children resolves itself into a routine that will keep them in the open air except when necessary to change their clothing, feed and bathe them. If roofs, balconies and fire escapes are protected by suitable railings and nettings the whole day may be spent out-of-doors away from the dirt and confusion of city streets. When such places cannot be utilized rooms arranged for nurseries must have windows that can be kept open and the child protected by clothing suitable for out-of-doors.

Roof gardens and open air porches afford the best means for giving children fresh air without making necessary an elaborate "dressing" that all children dislike. Free play in old clothes is a great incentive for a child to remain in the open air. Roof gardens may be arranged for playgrounds at a small expense, but care must be taken that vent-pipes and chimney flues are carried high enough not to contaminate the air at the level of children's heads.

An inexpensive sun parlor and playground can be built on the roof of a city house for \$150. The fence around the roof is to be made of chicken wire fastened to wooden posts. If iron posts are used the cost is higher. It is necessary to lay light timbers on the roof to protect it and to make a solid foundation for a

wooden floor. The sun parlor or playhouse is to be built of galvanized iron and enclosed on three sides with large windows that can be raised in inclement weather. If a roof is covered with flat tiles the wooden flooring that is necessary to protect a tin roof does not have to be laid. Provided with sand boxes, swings



PLAYGROUND FOR  
ROOF OF CITY  
RESIDENCE

FIG. 2.—Plans of sun parlor and playground which may be built for \$150.  
Scale,  $\frac{1}{4}$  inch to foot.

and light gymnasium outfits such a roof garden furnishes a secure place for almost all weather, and with a shed or lean-to it may be used for sleep and play on inclement days.

For older children the problem is not only that of fresh air, but more particularly of amusement and exercise. No indoor drills or dancing classes take the place of hop-scotch, tag and

roller skating. Games that can be played on the sidewalk of a crowded street or back yard are limited, and children need open spaces and playgrounds if they are to get the best results from life in the open air.

For the first five or ten years of a child's life he should do little else but play if we are to insure for him the best physical and mental development. Some of this play may be directed by competent nurses and teachers, but the best of all play is spontaneous in character, with constant change of action. Barrie, the novelist, recognizes this desire for change that is part of the physical and mental development of child life.

A walk on Fifth Avenue or in Central Park with the restrictions of police regulations cannot make up, in any way, except for an opportunity to be in the open air, for the free use of the muscles such as is enjoyed by children who can play out-of-doors regardless of police, nurses and clothes.

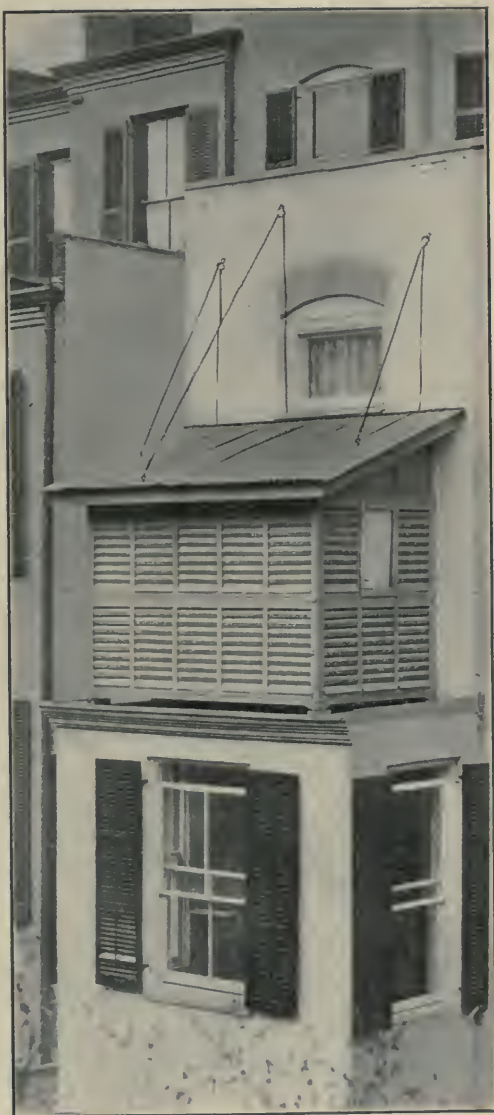


FIG. 3.—Starnook (Knopf Model) for outdoor sleeping.



One of the greatest difficulties with which a teacher has to deal in the management of young pupils is the desire for change and the natural predisposition to physical activity which always accompanies childhood and youth. Lane emphasizes this succinctly as follows:

"For the so-called normal condition of the skeleton it is necessary that during growing life the individual shall combine attitudes of activity with attitudes of rest, and that the attitudes of activity as well as those of rest shall be varied in character."

The school hours of children in kindergarten and primary classes should not exceed two hours for the former and three for the latter. Such classes can be held in open air schoolrooms and on roofs with beneficial results to the children, both from the standpoint of increased vitality as well as from a lessened danger from contagion. The stimulating influence of open air classes for children who are below the average but who are not tuberculous is shown in "Reports of Defective Children."\* These children gained in weight during the school year, although they showed an almost entire absence of gain during the summer months, probably due to home conditions. Their appetites improved during the school session, the hemoglobin was increased and there was also an improved mental condition as well as a gain in bodily tone and vigor.

A growing boy does not play ball in the street, tip over ash cans, break windows with a "cat" nor deliberately damage property with malicious intent, but because in the development of his body there is an irresistible impulse to use his muscles as part of the process of normal physiologic growth. If this activity is curtailed, physical development is retarded, but a mental activity displays itself in what often is regarded by people who do not understand the physical basis of the body, as malicious mischief. Give a boy who has only the street as his playground an opportunity to run, to swim, to play ball and to exercise in a normal spontaneous way in the open air and he will gain not only in weight, in height, and in general physical development, but he will acquire mental stability and will store away energy that will serve him in after life. Galton found that boys in country schools are taller, and also heavier than boys in city schools, and the potential energy of boys raised in the country is recognized as

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\* Thirteenth Annual Report of the City Superintendent of Schools, 1910-1911, Department of Education, the City of New York.

greater than that of boys whose lives are spent within the confines of a city.

Boys from well-to-do families, more often than girls, are sent to out-of-town schools when they are young, but before that time they need a freedom of exercise that it is hard to give them in the city. Every effort that can be directed to secure open air playgrounds and park spaces has effect in the improved health and development of children who live in the city.

Long walks are beneficial for boys and girls who can bear a fair amount of bodily fatigue, but, as has been observed, there should be periods of relaxation. A walk that is interspersed with other forms of exercise or diversified by some amusement is less tiring than a continuous tramp. City children who play on the pavement are unaccustomed to the country and do not always benefit by long walks, unless regulated, but they will gain in strength by diversified exercise and games in the open air.

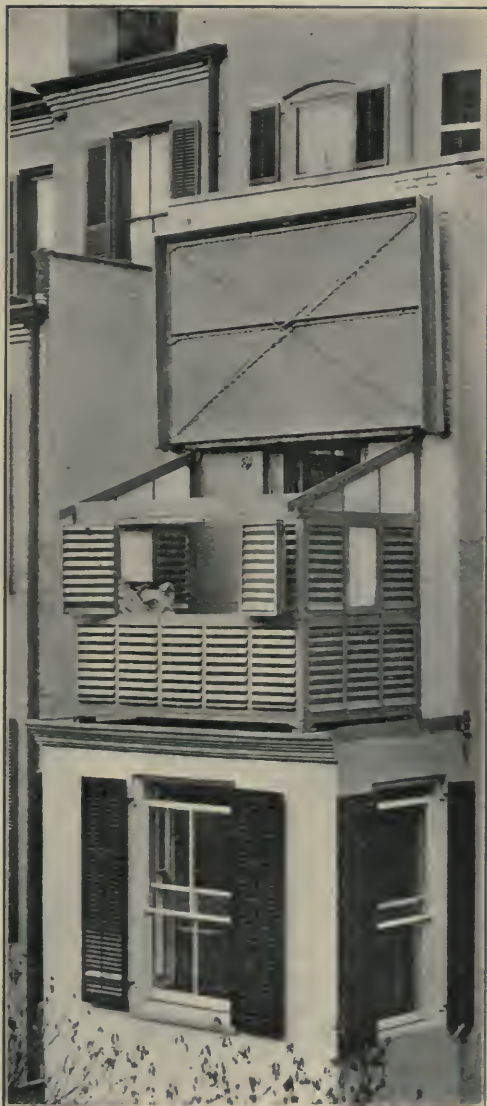


FIG. 4.—Starnook with roof raised for day use.

There is no reason why dancing and gymnasium classes should not be held on the roofs of buildings instead of in ill-ventilated rooms, and with children suitably dressed the advantages of such exercises would be augmented by the opportunities the children would have of breathing fresh air.

"Parents have to superintend the building of the human houses of the next generation. They are given twenty years to do it in. It is true that if they do nothing at all, the house will get built somehow, and if they abstain from hindering the proper design, they will do a great deal; but if having intellectually understood the plan of the great Architect, they do their best to carry out His designs to perfection, they will do much more.\*"

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STREPTOCOCCUS OF SCARLATINA AND THE REACTION OF FIXATION.—Ch. Foix and Et. Mallein (*Presse méd.*, March 26, 1910), after examination of the streptococcus of scarlatina in 12 cases, obtained 83 per cent. of positive tests of the agglutination reaction. This has been confirmed by the experiments of Schliessner, who in the same way obtained 81 per cent. of positive reactions. He concludes that the serum of the scarlatinous contains antibodies which act against streptococci, which can be easily isolated both from the throat and the blood in the course of the disease. These antibodies may be placed in evidence by the reaction of fixation in the great majority of cases. The reaction of fixation evident in scarlatina is absolutely negative to other streptococcemias, especially erysipelas. Thus the individuality claimed by Berge, Moser and Gabritchewski for the streptococcus of scarlatina is confirmed by the authors.—*American Journal of Obstetrics*.

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\* "Health for Young and Old," by A. T. Schofield, M.D.

## ON THE DIAGNOSIS OF ATYPICAL SCARLET FEVER.\*

BY D. J. MILTON MILLER, M.D.,

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In attempting to prepare a paper on the diagnosis of atypical scarlet fever, one assumes a most difficult task, not only because of the perplexities surrounding the actual question itself, but also because, after all, the subject resolves itself into a thesis upon the diagnosis of scarlet fever in general. Looking at the matter from a practical standpoint, the whole subject might be dismissed, indeed, with the statement: Isolate all doubtful cases until the diagnosis is assured. But it cannot be disposed of in this summary manner; it is far too important a question. Too much hardship would be worked to the patient, and too much discredit thrown upon the physician, by the blind following of such a course.

Scarlet fever is the most variable in its symptomatology. Cases running the ordinary course offer no difficulty in their diagnosis; but those that present themselves in an unusual or anomalous manner (and their number is not small) are extremely difficult, and very often impossible, to recognize. "The more of the exanthemata that one sees," says von Jurgensen, "the more is one convinced that scarlet fever is not always to be recognized." Mistakes are very common, and are readily made by the expert and the inexperienced alike. Thus, E. W. Goodall (*Practitioner*, 1909, p. 38) states that out of 24,434 cases sent as scarlet fever to the Hospital of the Metropolitan Asylum's Board, in 1907, 1,670 (6.8 per cent.) were suffering from some other disease. Of these, 377 proved to be rubella; 323, various erythemata; 264, tonsillitis; 137, measles; 43, pneumonia, and 35 chicken-pox. It is not very flattering to our skill, nor does it enhance the respect with which the public regard us, to confess to these limitations of our art; but by acknowledging and accepting them, we shall often be saved from humiliating error.

In considering the diagnosis of atypical scarlet fever it will be profitable to review some of the salient features of the affec-

\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Spring Lake, N. J., June 12, 1911.



tion; to discover, if possible, their actual value as a means of distinguishing scarlet fever from affections that may bear more or less likeness to it. First, as to the rash: It must be acknowledged that the diagnosis cannot be made from this feature alone. I shall not weary this audience by enumerating the host of erythemata that resemble scarlet fever closely, and sometimes absolutely, even in its most distinguishing feature, namely, the punctated appearance of the rash. But this quality may also fail, or the efflorescence may be so slight, so fugitive, so limited in extent, or confined to such unusual regions, as to be overlooked or attributed to some other cause. Moreover, the eruption may be absent entirely (*scarlatina sine eruptione* of the older writers), only the throat and the general symptoms being present. Suggestive of scarlet fever is a punctated rash beginning at the root of the front of the neck, a slight elevation of the follicles of the skin, browning of the flexure of the elbows, and, according to H. E. Cuff,\* a punctate rash on the inner aspect of the thighs, with the base toward Poupart's ligament. Men, who are in a position to speak *ex cathedra*, insist that many of the rashes simulating scarlet fever, but arising from some other cause, cannot be differentiated from the former affection. Hence, we are justified in reasserting that the rash alone is but a poor staff to lean upon in diagnosing atypical forms of scarlet fever.

*Desquamation.*—The desquamation is the most fruitful source of error. Many practitioners, it is true, make this their supreme diagnostic test. No desquamation, no scarlet fever, is their watchword. This position is manifestly incorrect, when we reflect that any intense erythema may be followed by exfoliation of the epidermis. Rubella scarlatinosa, measles, the scarlatiniform rashes sometimes accompanying various infectious diseases and dermatitides, toxic or otherwise, antitoxin and drug rashes, the erythema following enemas of yellow soap, burns, wounds, etc., and the rash of recurring desquamative scarlatiniform erythema may all be followed by peeling as marked as in pronounced scarlet fever. The time of the occurrence of desquamation is more helpful; as in the scarlatinoid rashes it is apt to occur earlier than in actual scarlet fever, sometimes before the eruption has vanished. Schamberg says that it may begin on the hands and feet, in the non-scarlatinal rashes, as early as the sixth day. Scarlet-fever

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\* Practitioner, 1909, 47.

peeling also lasts longer than scarlatinoid desquamation, and progresses in a more orderly manner. The pin-hole, concentric type of desquamation, often considered so characteristic, occurs in other conditions—notably after some forms of miliaria and other sudaminous eruptions. Almost pathognomonic is the peeling beginning at the free border of the nails of the fingers and toes, especially the fingers; but in mild and anomalous cases, and in cases without eruption, this may not take place. Finally, it must be admitted that scarlet fever may occur without any desquamation. I do not refer to cases with indeterminate rash or no rash at all; but to instances of the disease with pronounced rash, temperature, throat and tongue symptoms, and all the ordinary features of the disease, but with no desquamation. I have seen such a case (ARCHIVES OF PEDIATRICS, September, 1909), and so has C. G. Kerley (*American Journal of Diseases of Children*, January, 1911), while McCollum (*Osler's Modern Medicine*, Vol. II., p. 334), von Pirquet and Schick (*Pfaundler and Schlossmann, English Translation*, 1908, Vol. II., p. 272), and E. W. Goodall (*Practitioner*, 1909, p. 38) bear testimony to the same effect. The mere absence, or presence, of desquamation, therefore, does not help us in the diagnosis of atypical scarlet fever.

*The Tongue.*—The well-known peeling of the tongue cannot always be depended upon in differentiating scarlet fever. As there are grades of exfoliation of the skin, so there is also of the tongue; and, like the skin, it may not present any peeling at all. Regarding the latter case, E. Cuff (*Practitioner*, 82, 1909, p. 47) makes the useful observation that the tongue may lose its fur at a time when it usually loses its epithelium. The same writer observes that this cleaning, when the throat is still sore, is not seen in tonsilitis, diphtheria, etc. McCollum believes that the lingual papillæ (*those at the tip and border, he insists*) are more or less enlarged in every case of scarlet fever, and will always be found if sought for. This statement I cannot personally verify; but if correct, it should be of great value in the diagnosis of atypical cases of scarlet fever. Unfortunately, the size and prominence of the papillæ vary in different individuals; and the true glazed strawberry tongue is seen in other conditions (viz.: certain forms of chronic catarrhal gastritis and enteritis, the so-called geographical tongue, etc.), while Schamberg has observed it in scarlatiniform erythema and in a case of recurrent desquamative erythema. Notwithstanding this adverse testimony, the

condition of the tongue is of the utmost importance in differentiating all forms of scarlet fever, although a normal state of the organ does not exclude the disease.

*Fever.*—Scarlet fever may run its whole course with practically no fever or with no fever at all. This may occur with a pronounced rash or an indefinite one. A member of my own family had an initial temperature of 100°F., which subsequently never rose above 99°F., yet the rash and desquamation were most marked. Kerley (*loc. cit.*) has also reported an afebrile case with pronounced rash; and in Corlett and Cole's epidemic of 32 anomalous cases, 4 never had a temperature above 99°F. (*Journal of American Medical Association*, 1910, Vol. XV., p. 195); while among 3,000 cases observed by McCollum (*loc. cit.*), 102 had a temperature never above 99°F. Recently I had the privilege of seeing the son of a distinguished colleague, a boy of about eleven years of age, who had a mild angina with atypical scarlet fever rash persisting for five days, but without fever (Maximum temperature, 99°F.), characteristic tongue or desquamation, except on the eighteenth and nineteenth days, when the temperature rose to 101°F. for a few hours, coincident with a slight glandular enlargement on one side. I believed this case to be scarlet fever, as did his father and Dr. Schamberg. It must not be forgotten that scarlet fever may occur with the mildest or very few constitutional symptoms.

*Pulse.*—The well-known acceleration of the pulse during the first forty-eight hours of the attack—*i.e.*, a pulse higher than the temperature would lead one to expect—is frequently missing in mild, atypical cases of scarlet fever. I have seen it not above 90 or 100 with a temperature of 99° or 100° F., or above 120 or 130 with a temperature of 101.2°F.

*Albuminuria.*—The poison of scarlet fever appears to have an especial predilection for the kidneys, since albuminuria is probably more frequently present than in other diseases where the temperature and constitutional symptoms are mild. In only 7 of Corlett and Cole's 32 anomalous cases was there absence of all signs of nephritis. Of McCollum's 1,000 cases, only 23 per cent. were without some albuminuria, although in 40 per cent. there was but the "faintest possible trace." The writer is of the opinion, however, that the albuminuria observed during the early stages of scarlet fever is of the nature of the febrile



albuminuria seen in other acute diseases, and is not specific. Nevertheless, the presence of albumin affords contributory evidence of considerable value in the diagnosis of anomalous cases of scarlet fever.

*Throat.*—Of all the symptoms of scarlet fever the angina is the most constant. Indeed, it may be said, even in atypical cases, to be practically never absent. In cases in which it was missing, it was probably overlooked because of its mildness. The tonsils are probably the initial focus of the disease, the site of the primary infection; hence, the constancy of the angina. The latter presents itself as a deep general redness of the whole pharynx, with sometimes fine puncta upon the hard palate; quite frequently there is an exudate upon the tonsils. I have never seen a case without some degree of angina, but Kerley, Corlett and Cole and others have reported anomalous cases without this symptom; and quite often the appearance of the throat does not differ from that seen in ordinary follicular tonsillitis; at least, this is my experience.

*Vomiting.*—Although nausea and vomiting are such frequent initial symptoms in regular scarlet fever (J. Lewis Smith observed vomiting in 162 of 214 patients), they are so commonly absent in mild and aberrant cases as to be of little value in their diagnosis.

*Synovitis*, limited to the wrists, and appearing at about the end of the first week, is very suggestive of scarlet fever. Sometimes this joint affection amounts to but a slight stiffness of the wrist joints. Such stiffness following a doubtful rash points very strongly to scarlet fever.

The various ways in which atypical scarlet fever manifests itself are too numerous to mention. As already intimated, the one feature that exhibits the greatest vagaries is the efflorescence. Usually it is not seen upon the face, yet in a case observed by the writer (a young woman with marked angina and considerable fever, followed by desquamation of the face and trunk), the eruption was entirely limited to the face for about twelve hours as a uniform deep-red blush. Remarkable cases may be found in the literature in which the eruption has been limited to the hands, a portion of the thigh, or other parts of the surface. Difficult and impossible of diagnosis, in the absence of concomitant typical cases, are those forms of scarlet fever in which there has been no eruption; simply an angina and fever,



sometimes followed by desquamation, but more frequently by none. It is quite conceivable—nay, very likely—that some cases of supposed tonsillitis are, in reality, scarlet fever; and that such cases play an important part in the spread of the disease. Equally puzzling are the cases with pronounced and typical, although, perhaps, not extensive, rash, with slight fever and angina, and not followed by desquamation. Such a case I saw with our president last summer, in a girl of nine years. Many cases of this nature are diagnosed as rubella scarlatinosa, as toxic rashes, as tonsillitis with scarlatinal rash, or as so-called fourth disease (scarcely as the erythema infectiosum of Escherich). Some of these erythemata are undoubtedly of intestinal origin and toxic in nature; others may be isolated cases of rubella scarlatinosa; but, in the absence of other cases of rōtheln, such a diagnosis is hazardous. Usually, when German measles is prevalent, some of the cases assume—in part, at least—the morbilliform type. Still, epidemics have been reported in which almost every case has been of the scarlatinal variety, as in the outbreak at Round Lake, N. Y., reported by Shaw and Curtis (*Med. News*, December 20, 1902). The diagnosis must be made by a critical review of the entire clinical picture of the case. In differentiating scarlet fever from rubella scarlatinosa, an observation made by the writer some years ago (*ARCHIVES OF PEDIATRICS*, January, 1905) may be of service, viz.: a prolonged prodromal period, even as long as five days. This occurs more frequently in rubella than is generally supposed. It is well to remember, also, in this connection, that rubella is a rare disease, while scarlet fever is a common one; and that the custom of denominating as rubella every mild scarlatinal affection is a pernicious one, and a fruitful source of dissemination of the more serious complaint. Rubella scarlatinosa, as a diagnosis, should be accepted only on the strongest evidence; and “lack of well-marked signs, or of any of the usual signs of scarlet fever, as all of us know, is not sufficient to exclude this exanthem.”

No careful physician is called to attend a case of supposed scarlet fever without inquiring as to the previous attacks, and is often guided in his decision by the reply received. In anomalous cases, this information is of the greatest value; yet one should not be too hasty in deciding against scarlet fever because of the history of a previous attack in the same individual.

Second attacks, although rare, do occur. McCollum saw ten instances of genuine scarlet fever among patients who, two to four years previously, had undergone undoubted attacks of the disease. Griffith has recently reported a case, and Körner collected 77 cases (H. Weisenberg, *Archiv. f. Kinderhk.*, 1909-10, Vol. XII) in which the first attack occurred mostly in children under ten years; the second attack from two to six years later. It is likely that some of the cases, particularly the earlier ones reported as recurrent scarlet fever, were instances of some other disease. Many were diagnosed before erythema scarlatiniforme desquamativum recidivas was recognized. Granting this, there remains not an insignificant number of authentic cases. The history of a previous attack, therefore, should not rule out scarlet fever in doubtful and anomalous cases, if there are sufficient signs to make that diagnosis probable; but such a history is more valuable in excluding those various forms of erythema scarlatiniforme with pronounced efflorescence, mild constitutional symptoms and undefined angina. W. M. Baum, of Chicago, (discussion following Corlett and Cole's paper, *Journal of American Medical Association*, 1910, Vol XV., p. 199) states that increase of the polynuclear neutrophiles is proof positive of scarlet fever, and that cases are admitted into or excluded from the wards of Cook County Hospital by this test alone. This, if correct, would place in our hands a ready means of differentiation; but other observers have not found in differential counts of the blood any such simple solution of the problem. McCollum, for instance, says: "So far, differential blood-counts have not been productive of anything very definite in the diagnosis of scarlet fever."

*Surgical Scarlet Fever.*—The erythematous rashes accompanying wounds, and especially burns, are, in the majority of cases, true scarlet fever. They are, in fact, scarlet fever in the wound. In these cases, the infection manifests itself in an anomalous manner; the throat and tongue are but little affected; the rash is apt to be paler, and to commence about the wound; and desquamation may be entirely wanting, as in a case following a burn under my care some years ago. Quite often the disease has been communicated to others by this so-called surgical scarlet fever. Schamberg records a case in which the infected person, a nurse who had cared for a child with an erythema following a burn, died from scarlet fever. Hence, all such rashes

should be regarded and treated as scarlet fever in spite of their atypical character.

In the opening sentence of this paper reference was made to the difficulties attending a satisfactory presentation of the subject of my thesis; and now that the task is almost completed I feel that my apprehensions have been justified. I realize that I have contributed very little to the elucidation of the problems connected with the diagnosis of the anomalous and atypical forms of scarlet fever.

*Conclusions.*—(1) The differentiation of unusual forms of scarlet fever will remain a stumbling-block to the practitioner, until we have discovered the cause of the disease, and are able to employ similar tests to those that we now apply to diphtheria, typhoid fever, syphilis, etc.

(2) Not one of the individual symptoms can be depended upon to establish the diagnosis. The disease may occur without rash, desquamation, fever or strawberry tongue. The whole clinical picture must be carefully considered and the individual symptoms critically studied.

(3) The most constant symptom is the angina; and its presence, associated with a scarlatinal eruption, however slight, however evanescent and however limited in its distribution, should be regarded as sufficient to establish the diagnosis—or, at least, to demand isolation and close observation.

(4) Next to the throat the condition of the tongue is the most reliable symptom, some enlargement of the papillæ of the tip and border being usually observable, although this symptom is much more frequently missing than is the angina, and may occur in other conditions.

(5) Of all the exanthemata, scarlet fever is the most varied and uncertain in its symptoms; and of all the symptoms, the rash presents the greatest vagaries. Hence, no rash, especially in a child, is too trivial to be disregarded, whatever the general symptoms may be.

(6) Scarlet fever with well-marked rash may occur without desquamation.

(7) Rubella scarlatinosa is often diagnosed when scarlet fever presents itself as a pronounced erythema with mild constitutional symptoms. This error is a fruitful source of dissemination of the more serious affection. The diagnosis of rubella should be accepted only upon the strongest evidence.



(8) The history of a previous attack of scarlet fever should not prevent us from treating with suspicion apparently anomalous cases of the disease.

(9) Differential blood-counts have produced nothing of value in the diagnosis of scarlet fever.

(10) Surgical scarlet fever and scarlet fever following burns are scarlet fever in the wounded, and should be treated and regarded as ordinary cases of the disease.

(11) Scarlet fever without eruption, and other anomalous forms of scarlet fever, are a fruitful source of dissemination of the disease.

(12) Finally, all doubtful erythemata, and all cases in any way resembling scarlet fever, should be quarantined until the diagnosis is reasonably established.

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PRESENCE OF DIPHTHERIA TOXINS CIRCULATING IN THE BLOOD.—Gino Menabuoni (*Riv. di Clin. Ped.*, January, 1910) has investigated the presence of toxins circulating in the blood, and the possibility of their being the cause of diphtheritic paralysis. He injected diphtheria toxins into rabbits, and found that they always caused a gelatinous infiltration at the site of injection. He then injected them with the blood of infants sick with diphtheria in various stages, and found that in the early stages this gelatinous exudate was produced, but that later in the course of the disease it was absent. Toxins were found for several days after the disappearance of the exudate in the throat; but later than this there was no evidence of their presence in the circulation. The membrane in the throat is accompanied with virulence of the bacilli, but when they are destroyed there is no longer toxins in the blood. Hence the paralytic phenomena are not due to circulating toxins, but to toxins that have become fixed in the cells. The toxins become slowly but stably fixed in the cells; hence the necessity of preventing this fixation by the early use of antitoxin. The avidity of the toxins for the receptors of antitoxin is greater than that for the receptors of the cells, hence the antitoxin neutralizes their power.—*American Journal of Obstetrics.*



## RUMPELL-LEEDE PHENOMENON OF SCARLET FEVER.

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At the Medical Society of Hamburg in June, 1909, Rumpell called attention to the fact that in scarlet fever hemorrhages could be produced into the skin of the elbow by application on the arm of a Bier's stasis bandage. He said this procedure was of value in diagnosing scarlet fever without an exanthem. At the suggestion of Rumpell, Leede commenced a systematic study of the matter. To produce the stasis, he applied a Riva-Rocca blood pressure apparatus, found the diastolic pressure, lowered it to 45-60 mm. of mercury and then left the arm band in place five to twenty minutes. He found that in scarlet fever patients (and 200 were examined) this procedure invariably caused hemorrhages to appear on the anterior surface of the elbow. It was proved that the longer the disease was established the slighter was the tendency to hemorrhages, so that during the third week a pressure of 50-60 mm. was necessary to cause them, and then only after being applied fifteen minutes.

The test was negative in a number of patients in whom scarlet fever was suspected and in whom further developments proved that the disease was not scarlet fever. Also a number of patients were examined before and after contracting scarlet fever. The test, negative in the first instance, became positive in the second.

Patients suffering from other diseases only exceptionally showed hemorrhages. Eleven with measles, however, exhibited them, as did a few normal individuals—but these latter needed a much higher pressure.

Leede thinks the hemorrhages are due to an increased vulnerability of the blood-vessel walls, caused by the scarlet fever toxin. He mentions the experiences of Hecht, who showed that hemorrhages could be produced into the skin of scarlet fever patients by merely lifting up a fold from the back or chest and holding it under pressure for a few minutes between the thumb and index finger. Hecht measured the amount of pressure exerted by means of a mercurial manometer and showed conclusively that in the hemorrhage diseases, in scarlet fever, measles and diphtheria, there is a lowered resistance of the blood-vessel walls.

From his studies, Leede concluded that a negative result is

positive evidence against the presence of scarlet fever, while a positive one is not in itself conclusive.

Several other writers have repeated Leede's experiments. Benneke obtained positive results in thirty cases of scarlet fever, in a number of cases of measles, in two of chronic nephritis and one of influenza. He agrees with Leede that a negative finding speaks against scarlet fever, while a positive one does not prove the presence of this disease.

Albert Mayr examined 100 patients in whom scarlet fever was absolutely excluded. In twenty a positive reaction occurred.

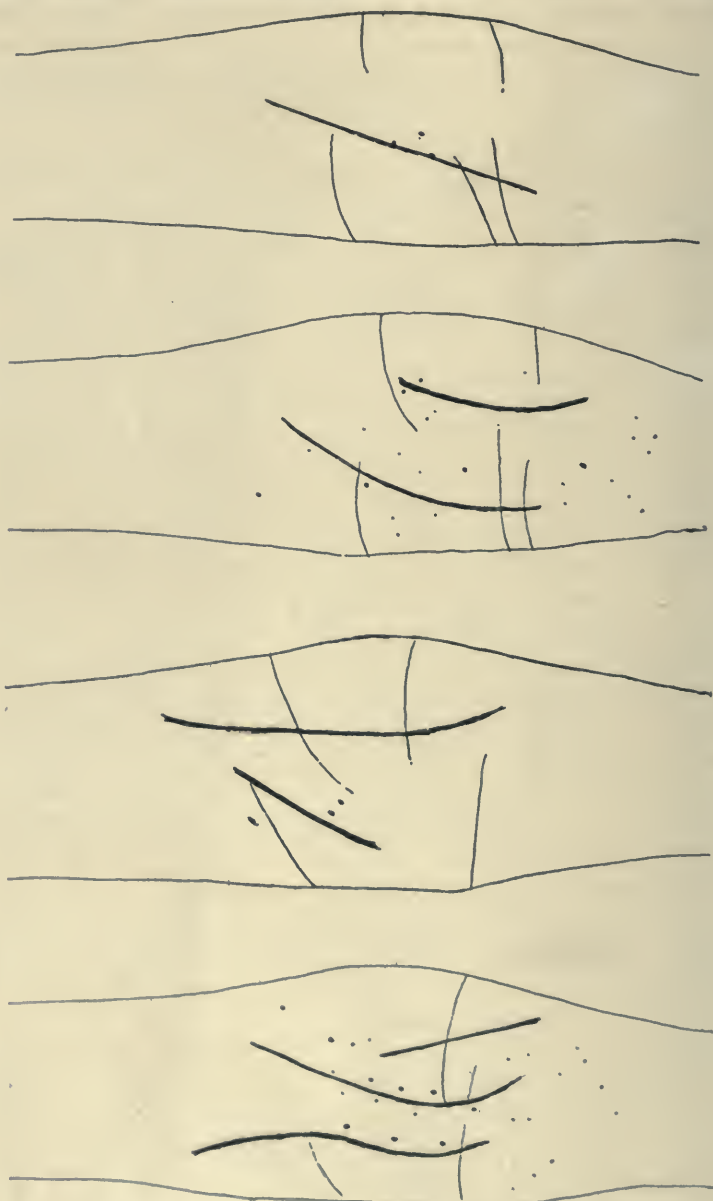
Herman Mayer, writing on this subject, mentions that he has very frequently seen petechiæ appear on the arm in which stasis has been produced to obtain blood for serological diagnosis.

On August 3d of this year I was called to see a six-and-one-half-year-old boy, whom I had attended during an attack of scarlet fever in February. On this morning he had a temperature of 100° F., a diffuse red throat and a well-marked erythematous rash over the entire body—perhaps a little more noticeable in the groins, axillæ and on the anterior surface of the elbow joints. There was a small pustule on the left hand, which was swollen. Blood examination showed a moderate leukocytosis and an eosinophilia of six per cent. With Leede's article on the so-called Rumpell-Leede phenomenon in scarlet fever in mind, a bandage was fastened around the middle of the child's arm and very moderate pressure exerted. In three minutes the entire anterior surface of the elbow joint was dotted with petechiæ, varying in size from a pin-point to a small split pea. (Fig. I.) A tentative diagnosis of recurrent scarlet fever was made and the child isolated. The next day his temperature was normal, the rash had disappeared, but the throat was still reddened. The child was kept isolated ten days, but there was no scaling.

The finding of such a well-marked Rumpell-Leede phenomenon in this instance, which was evidently not one of scarlet fever, suggested its study in normal children, the better, perhaps, to judge its value in scarlet fever.

Two series of tests were made. In the first, 100 children—forty-eight boys and fifty-two girls—were examined. They varied in age from four and one-half to fourteen years. In this group, pressure was exerted with an ordinary muslin bandage. The Bier stasis bandage, as suggested by Leede, was tried, but it was found that pressure could be better regulated with the muslin

one. This was placed half way up the arm, drawn tight enough to produce a decided blue discoloration of the forearm and was left in place from three to eight minutes. At the end of this



Showing variations in location and number of petechiae.

time, in ninety-eight of the children petechiæ appeared on the anterior surface of the elbow joint. Sometimes it was necessary to repeat the experiment a number of times before positive results were obtained. This happened more frequently at the beginning of the tests than later, when practice was gained in the amount of pressure to be exerted.

The picture produced was a fairly constant one. The space between the lower edge of the bandage, and sometimes even beneath the bandage to the lower border of the anterior surface of the elbow, was dotted with hemorrhage spots, varying in size from a pin-point to a small split pea. In some instances there were but two or three, in others the spots were too numerous to count. They could be more plainly seen after the bandage had been removed and when the skin was held taut for a second or two. They appeared quite suddenly, usually all at once. Some of the children complained of pain just before the hemorrhages appeared. They faded gradually in twenty-four to forty-eight hours.

Boys reacted more readily than girls. Age made no difference; older children reacted as readily as the younger ones.

In the second group of children the same amount of pressure was exerted as Leede used in his scarlet fever patients, namely, 60 mm. pressure. The arm band of the Riva-Rocca blood pressure apparatus was adjusted. The pressure raised to 60 mm. and kept at this height for ten minutes. In order to compare results, the same children as in the first group were examined. Of the fifty tested, thirty-two, or sixty per cent., gave positive findings. In this group, however, the number of hemorrhages were fewer and their size smaller. Two or three pin-point petechiæ were the usual findings, though in a few instances they were rather numerous.

From this study, the following conclusions may be drawn:—

1. Hemorrhages can be produced into the anterior surface of the elbow joint in practically all normal children by applying sufficient pressure around the arm.
2. A pressure of 60 mm. applied for ten minutes will produce hemorrhages in sixty per cent. of normal children, but to a much more limited degree.
3. These findings corroborate those of Leede and the other authors cited that a positive Rumpell-Leede phenomenon cannot be regarded as a diagnostic sign of scarlet fever.

Since finishing this work, another article on the subject by



Strauch has been brought to my notice. Strauch's results confirm mine—for he obtained positive reactions in forty-five per cent. of normal individuals; also he obtained more marked reactions in males than in females.

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OCCURRENCE OF ADENOIDS.—Macleod Yearsley (*British Journal of Children's Diseases*, February, March, 1910) has investigated this subject in three London elementary schools with an attendance of 2,315. He concludes that on the average about 37 per cent. of the children in elementary schools have adenoids, and that between 72 and 76 per cent. of these have enlarged tonsils as well. On the average, 31.2 per cent. of adenoid cases are mouth-breathers, complete or partial, and that hypertrophy of the faucial tonsils may give rise to mouth-breathing in the absence of adenoids. Sex appears to have no influence upon the incidence of adenoids. Adenoids are more common about the age of eight years, and are next most frequent at about twelve years. True aprosopia is often confused with apparent dullness due to defective hearing, and it occurs in only about 4.7 per cent. of adenoid cases, is more frequent in girls, and, when present, is associated with a marked degree of adenoids. The so-called adenoid facies is uncommon, except in association with a marked degree of adenoids. The association of an abnormally high palate with adenoids is rather due to peculiarities of cranial formation than to extrauterine influences of nasal stenosis, and, if there is any relation between a high, narrow palate and adenoids, it is possible that the palate shape is rather a cause of adenoids than *vice versa*. The presence of adenoids has more to do with the presence of carious teeth than with mouth-breathing and palate shape, and this is probably due to the increased tendency to oral sepsis in adenoid children. Irregularity of the upper incisors is less a result of adenoids than of palate shape. The percentage of ear complications in adenoid children is about 10.8, and adenoids are probably by far the most important factor in the etiology of ear affection in childhood.—*American Journal of Obstetrics*.

## WHAT NEW JERSEY IS DOING FOR THE EPILEPTIC.\*

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Superintendent New Jersey State Village for Epileptics.

The first official action looking toward the special care and treatment of the epileptic in New Jersey was taken in February, 1877, by Dr. John W. Ward, Superintendent, and Mr. Charles Hewett, member of the Board of Managers of the New Jersey State Hospital at Trenton, when they appeared before a Joint Committee of the Legislature and asked for an appropriation for a separate building in which to care for the epileptics. Again in 1884 Dr. Ward went before the Appropriations Committee and urged upon them the necessity for providing separate care for this class of cases.

Professor S. Olin Garrison, the founder and principal of the New Jersey Training School for Feeble-minded Children at Vineland, soon after opening the school in 1888 recognized the injurious influences of the epileptic upon the other pupils, and at once became an earnest worker and a strong advocate for a special institution in which to care for the epileptic. He made many sacrifices and gave freely of his time and energies in the establishment of "The Village" at Skillman.

The Act creating the institution was signed by Acting Governor Voorhees March 26, 1898, and "The Village" opened on November 1st of the same year.

The first patients were admitted to Maplewood Cottage, which was used as an administration building, residence for the Superintendent, necessary employees and patients.

The grounds, consisting of a little less than 800 acres, are located in Montgomery Township, Somerset County, at Skillman station, on the line of the Philadelphia and Reading Railroad.

The problem of devising and pushing forward a more widespread interest in systematic State care for the epileptics is a serious one. No class of defectives so strongly demands public

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\* Read at the public meeting of the New Jersey State Pediatric Society, held at Lakewood, N. J., Oct. 28, 1911.

aid and care, nor have been so long subject to neglect, as the epileptic. He is a source of danger to society in his acts of violence during the periods of his mental disturbance, and by breeding a progeny in which defective characters predominate.

Out of 100 epileptics studied at random, either in or out of institutions, from 5 to 10 per cent. will be found to be of unsound mind; 18 to 20 per cent. to be insane; 70 to 80 per cent. to have a mental disablement to some degree. Fully 80 per cent. of them will acquire the disease before they reach the age of twenty years.

There is much medical work to do in searching for the causes of or diseased condition which may contribute to epilepsy. As a class, they are much more difficult to deal with than the insane, as they possess to a larger degree the mental and emotional traits of children.

Medical attention for this class of patients requires men with special training. Accidents and other diseases are not infrequent. Mental and surgical conditions arise when only the most skilful attention will save the life of the patient.

Among the most discouraging things with which we have to contend are the bad results following the visits of friends and relatives, who frequently, through mistaken kindness, bring confections, etc., resulting in a series of convulsions. Experience has demonstrated that visits away from the institution are deleterious, the patient invariably returning worse for the absence from the institution routine.

The treatment of the disease is carried on most successfully by encouraging the patient to lead a life of regular routine. The idle epileptic is badly handicapped in his effort for improvement in comparison with the one who is kept busy. Due consideration being given to his mental and physical condition, every patient is required to do something, be it ever so small or light a task, which, under careful oversight on the part of the staff, acts as a therapeutic agent of great value. The work to which he is assigned is selected with the greatest possible care not to overtax his strength and still have the task sufficiently vigorous to stimulate digestion and aid in the elimination of waste products. The use of drugs is falling off more and more, as experience has demonstrated that they suppress rather than cure the seizures,



and hasten the mental deterioration, which characterizes the disease.

The key to the prevention lies in the restricted use of alcohol, the prevention of the spread of venereal diseases, segregation or sterilization, thus making impossible the multiplication of defectives.

As discipline has a therapeutic value, in that it fosters self-control and may, in many instances, have a beneficial influence on the seizures, one of the first things the patient is taught is to submit to discipline. The greater number of our patients have known no control.

He soon learns that "The Village" has carefully planned his day and night. His meals are served at regular hours, and consist of proper quantities of selected foods. He retires and rises at a given time. He is provided with suitable occupation, and is expected to employ himself to the best of his ability during the hours of his employment.

The buildings and furniture are constructed with special reference to his needs—all corners are rounded, doors recessed, halls broad, stairways broken with two or more landings, heat pipes and radiators protected, thus reducing the liability to accident during seizures.

For his leisure hours, amusements are provided in the form of baseball and football in season. When outdoor exercise is not possible, entertainments and membership in The Village Club, contingent on a long period of good behavior, provide means for recreation and act as a stimulus for good conduct.

On admission, a thorough examination is made of the patient by an assistant physician, dentist and psychologist. The physical and mental condition being now available for use by the assistant physician, to whose service he is admitted, the patient is assigned some occupation for which he is fitted physically and mentally.

Every patient is photographed in his natural pose, except where scars, burns or deformities exist. In these cases special care is taken to reproduce them in the carbon print. By this means a record is made of the patient for comparison in later years, when family and friends have forgotten how he looked on admission. We have also been able to give the family a photograph of a deceased patient of whom they had no picture. The photographs, taken at intervals during the residence of the patient in the institution, show in a very forcible manner the



changes in facial expressions, mental and physical conditions, and furnish an accurate record of the progress of the disease.

The school was opened on November 4, 1906. So far as I have been able to learn, this is the first school established in New Jersey for the exclusive instruction of the epileptic. At the present time there are seven teachers, one kindergartner, one for primary and intermediate grades, one for physical culture, one for sloyd and manual training, one vocational and industrial teacher, and a band master, with a principal to direct and supervise the work.

When a child enters "The Village," after he has been assigned to his cottage, and becomes accustomed to his new surroundings, which usually requires a week, he is sent to the school, where the principal teacher examines him, making a record of the results of the examination, at the same time recording the grade and school attended before entering the institution. In case no education has been received it is so stated. By this means the child is placed in the class to which he properly belongs, and we are enabled to communicate with the teacher who had the child under observation before he entered the institution. In this way we often receive valuable information regarding the early school life and mental condition of the child.

The course of study, modified to meet the needs of the epileptic, was adopted after studying the prescribed courses of the several counties throughout the State. Each child of necessity receives more individual instruction than is possible in the public schools. The children are taught in classes whenever possible. This can be successfully done through the primary and intermediate grades. Some few patients are advanced far enough to take some studies of the grammar grade. These latter cases are given individual instruction and taken as far as it is possible for them to progress. The epileptic requires more time to cover the same course of study than the normal child, often three, four or even five years being required to complete the work of one grade. Owing to the weakened intellect and the ease with which the child fatigues when required to exert his mental faculties, English can only be taught from one and a half to two hours a day. A single convulsion may efface the work of years; for this reason more time is devoted to manual, vocational and industrial education. Here, again, the work is planned to meet the intellectual development. Experience demonstrates that the com-

bined training of the brain and voluntary muscles is the best method of education for the epileptic. The value of the latter being fully as great as 10 to 1.

The question may be asked why a school should be conducted in an epileptic institution. The answer is that the epileptic is better employed. His deterioration, which comes sooner or later, is held in abeyance by training. The public school excludes him. Practically all of the patients admitted to an institution have never been required to do anything, some of them not even to dress or wait upon themselves. The institution has to teach them personal hygiene, to dress, undress and feed themselves, and after this has been mastered, teach them to assist others, and in this way to become active, useful, members of "The Village." The great lesson which we are trying to teach is that the best treatment for epilepsy is a matter of right living. The school lays the foundation for the work throughout the institution, in the truck garden and on the farm.

The various departments throughout the institution are in charge of persons skilled in the particular position which they occupy. Patients are assigned to them, and instructed by them in the work of their department. In this way the labor is utilized to the best advantage, and the patient feels that he is doing something for the institution, of which he is a part. The labor rendered by patients is not self-supporting nor ever can be, for the reason that we are dealing with an individual below the normal standard of his race. No amount of training can transform one originally defective into a self-dependent member of society. He, therefore, cannot accomplish the average amount of labor, nor are we able to find among our patients those who can do all the many things necessary in the running of an institution such as ours.

About 50 per cent. of those admitted are able to do work of a remunerative kind; 25 per cent. are able to do housework only; while the remainder nothing at all. All of the housework, with the exception of cooking, is done by the patients under the supervision of the attendants. No patient is permitted to go near the fire, owing to the danger of falling in a convulsion and the consequent injury which might result.

On January 1st, 1909, a resident dentist was employed, since which time the beneficial result of the dental work is showing itself daily.

Most of the patients entering the institution have had no dental attention, except the extraction of an aching tooth. Fully 90 per cent. had never used a tooth brush. The gums are swollen, spongy, highly inflamed, loose and overlapping the teeth, which are, for the most part, decayed or roots are deeply stained.

The dentist cleans the teeth and instructs the patients in the use of the tooth brush, which now becomes part of the daily toilet. The dental work necessary to put the mouth and teeth in condition to properly masticate food is done as soon after admission as possible.

Two years after, the teeth of 59 patients were put in the best possible condition; in 38 the convulsions have decreased; in 14 they have increased; while in 7 there has been no change.

Some interesting observations regarding the sensibility of the teeth have been noted. It is possible to drill into a pulp cavity without the patient evidencing the slightest discomfort. It is necessary to show him the jumping nerve on the end of the broach to satisfy him that it has been removed. That this anesthesia was not due to the effect of drugs was demonstrated in several patients who had not been on drugs for a long period of time.

Realizing that at best the family history furnished on the admission of the patient and in reply to letters addressed to friends is unsatisfactory, on March 1, 1910, a young woman was appointed to visit the homes, relatives and friends of the patients and applicants for admission, and collect data bearing on heredity and environment. Her visits to physicians, clergymen, teachers, and others who may have knowledge of the patient and family, have awakened new interest in him, and brought all these persons and the institution in closer touch than would otherwise have been possible.

The opportunity to ask questions and learn of the scope and work of the institution has been fully appreciated by all with whom she has come in contact. At this writing, the entire State has been covered; the relatives and friends of 372 patients have been interviewed, and the histories of these families recorded and studied. Relationship between several of the patients has been established and many others may, on further investigation, prove to be related.

The data collected contains information about 17,294 individuals who are blood relatives of our patients, of whom 5,533 have



been classified as follows: 700, or 12 per cent., epileptic, 350, or 6 per cent., feeble-minded; 169, or 3 per cent., insane; 535 alcoholic, 141 migrainous, 640 tubercular, 2,427 normal, while the remainder are either criminalistic, syphilitic, sexually immoral, blind, deaf or neurotic; 56 per cent. of these classed are defectives, 24 per cent., exclusive of epileptic and feeble-minded, are neurotic.

Of the unclassified much data is available for future study and classification.

Many have been dead so long that reliable information is not obtainable; 1,703 died before fourteen years of age, while some are held for classification until further investigation can be made.

The classified offspring from the matings of two epileptics, two feeble-minded persons, or an epileptic and feeble-minded person, or an epileptic and insane person, have all been defective. In the mating of epileptics with alcoholics, neurotics or normals, the percentage of normals among the classified offspring is very small. In the first instance 14 per cent., in the second 9 per cent., and in the last 33 per cent., which emphasizes the dangers resulting from epileptic matings.

The psychologic department at "The Village" was established October 1, 1910, since which time all our patients have been examined by the Binet-Simon and form board tests, with several special tests under way.

One of the most interesting problems in the study of epilepsy, especially in children where the convulsions began early in life, is the mental deterioration, varying from a slight mental enfeeblement to dementia bordering on idiocy.

As a help in determining the mental age of our patients, the Binet-Simon test has been of great value. 1.8 per cent. have a mentality equal to one year, 3.9 per cent. to two years, 3.3 per cent. to three years, 4.8 per cent. to four years, 3.0 per cent. to five years, 6.6 per cent. to six years, 9.6 per cent. to seven years, 16.5 per cent. to eight years, 8.4 per cent. to nine years, 24.9 per cent. to ten years, 8.4 per cent. to eleven years, 3.3 per cent. to twelve years, 5.4 per cent. to thirteen.

The application of a test to adults and children, designed for children, leads us to believe that the test can be most successfully utilized for children and that conclusions can be drawn in the feeble-minded with greater accuracy than with the epileptic. If epilepsy were only a question of feeble-mindedness the test



would probably be more successful, but in epilepsy one has to deal with another problem, namely, that of deterioration. The Binet-Simon test clearly demonstrates the difference.

Normal children, as has been pointed out by Goddard in his test of the Vineland School children, answer practically all questions correctly according to their specific ages. The imbeciles stop at a certain age, quite below their chronologic age. The majority of our records of the epileptic show that many of the children answer all the questions relating to a specific age, then fail to answer questions for the following one or two years, to again answer questions assigned to successive years of mental development. For example, they answer all the questions for eight years, fail to answer any for nine and ten, and then answer the majority of those for eleven years.

The assumption is that the development of epileptics progresses normally along certain lines, the epileptic convulsion inhibiting development of special faculties, or there is a physiological deterioration at various levels in the brain.

One of the most simple tests used to assist in determining the mentality was the form board, which consists in placing different shaped blocks into holes of the same shape. In the determination of normal children, the time necessary for the child to place the blocks in the right holes is sufficient to determine the degree of mental ability. The time record itself, however, would not be a proper indicator in epileptics, where the psychomotor retardation is very prominent, and complicates the results. This test is very successfully used in differentiating the congenitally imbecile child or adult from the deteriorated one. If the epileptic were once normal, he is able to slowly but correctly place the blocks in their respective places, while the imbecile tries impossible arrangements, such as trying to place a star into a triangle, during the test acting in a perfectly helpless manner. If his defect is of a very pronounced degree, he will not be able to even follow a demonstration of the test.

To determine the effect of the convulsions on the mental ability, trainability and development, the test of adding two consecutive one-figure numbers for a period of five or ten minutes, then a pause of the same length of time, and another of counting (as used in the Kraepelin psychiatric clinic in Munich) is being applied to the epileptic. By this means, the effect of training, fatigue, rest, stimulation impulses and convulsions are easily

traced. In his comparatively normal state, the epileptic is never really normal. His will power and ability to work being below normal.

With a view of determining the personal, social, industrial and school efficiency of the epileptic as compared with the normal person, blanks have been prepared and distributed throughout the institution, on which the attendants, supervisors, department heads, teachers, officers, and other employees with whom the patients come in contact, will, after three weeks' observation, make their record. The progress so far made with this study is encouraging.

To briefly summarize: The State of New Jersey is providing a home where the epileptic may earn part of his maintenance and be protected, as far as possible, from accidents incident to his disease; a place where he may have hospital care, daily medical advice, dental treatment, education, amusement, recreation and religious service, together with the investigation of his heredity and the psychological study of his disease; thus relieving the family, friends and society of the dread and danger of his presence.

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CONCERNING THE PERIOD OF INCUBATION OF SERUM SICKNESS.—Hamburger and R. Pollak (*Wien. Klin. Woch.*, August 11, 1910). The authors in their study of the incubation period of serum sickness find that four or five days after injection a distinct precipitin reaction is generally obtainable. If the truth of these observations be granted, the generally accepted incubation period of eight or more days, as given by v. Pirquet and Shick, must be materially modified; and by the fifth or sixth day in most cases serum sensitiveness should be easily demonstrable. This increase in serum sensitiveness does not appear suddenly, but slowly increases from day to day. The antibody seemingly does not increase by arithmetical but by geometrical progression, and must be present in fairly definite amounts before manifest clinical symptoms appear. It is upon this basis that they explain the rapid onset of the symptoms of the serum sickness.

## CURRENT LITERATURE.

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### ABSTRACTS IN THIS NUMBER BY

DR. T. WOOD CLARKE.

DR. C. D. MARTINETTI.

DR. CHARLES E. FARR.

DR. RICHARD M. SMITH.

DR. WILLIAM LYON.

DR. S. W. THURBER.

DR. J. HERBERT YOUNG.

### DISEASES OF THE EYE.

LEFEVER, C. W.: THE MANAGEMENT OF SQUINT IN CHILDREN. (*American Journal of Diseases of Children*, February, 1912, p. 107.)

The author discusses the etiology and the treatment of squint in children and places the blame for a continuance of the condition first upon the parents, and second upon the pediatricist and oculist. It is only by coöperation of these three individuals that all cases can be recognized and properly treated. He believes that cures are possible in 100 per cent. under favorable management if the children are seen early enough. Two important points in the etiology are first the fact that all the children are far sighted in that in any attempt to accommodate the overstimulation which is necessary to accomplish this causes at the same time an excess of stimulus in the other branches of the third nerve resulting in a drawing of the eye inward. Since binocular vision is impossible with the eyes in this position failure to treat the eye results in loss of vision in one eye. The treatment consists in the first place in the correction of the hyperopia which may be done by the use of glasses. The glasses may be worn early provided the children are carefully managed. Atropin may be used to suppress the accommodation, but is only a temporary expedient when glasses are out of the question either because the child is too young or for some other reason. The amblyopia must be cured and this requires close watching for a considerable length of time in order that the child may learn to use the eye the image from which has been disregarded. Frequently it is necessary to close the good eye with a frost lens as a temporary expedient, and then by careful training the gradual removing of this glass and fusion as soon as may be. Operation is indicated only as a last resort.

RICHARD M. SMITH.

TIBONE, P.: OPHTHALMIA NEONATORUM. (*Annali di Ostet. e Ginec.*, 1909, No. 7.)

The great majority of cases of the disease occur through gonococcic infection. A small proportion is due to the following: Weeks' bacillus, diplococcus Morax, pneumococcus, Pfeiffer's bacillus, strepto- and staphylococcus, bacterium coli and various amebæ.

Ophthalmia may be styled *congenital* when infection has occurred within the uterus through puncturing or alterations of the membranes. *Early* forms occur in the pelvis at birth, and *late* or *secondary* if several days elapse after birth before its appearance. The presentation, term, anomalies, resistance of the fetus all contribute. Prophylactic measures tend to obtain the following results: Disinfection of the female genitals at confinement and application of suitable powerful agents to the ocular conjunctiva of the child. The duration of the disease depends principally upon the severity of infection and period elapsed before treatment is begun. Complications are frequent. Disinfectants satisfactorily used are solutions of  $\frac{1}{4}$  of 1. per cent. to  $\frac{1}{10}$  of 1. per cent. of potassium permanganate.

C. D. MARTINETTI.

## DISEASES OF EAR, NOSE AND THROAT.

HOPKINS, F. E.: A CASE OF MULTIPLE FOREIGN BODIES IN SMALLER BRONCHII. (*Annals of Otology, Rhinology and Laryngology*, December, 1911, p. 825.)

On June 5, 1910, a girl of four years was said to have inspired a peanut. X-ray examination revealed nothing; bronchoscopy showed no foreign body in either the trachea, right or left bronchi. There was marked retraction of the chest walls on inspiration, wheezing and whistling râles and a small area of dullness above the right nipple. After two days a second bronchoscopic examination was made with negative results. The child died an hour later, and an autopsy revealed small fragments of the nuts scattered throughout the lungs; around each fragment there was an area of congestion and pneumonic exudate; twenty-four of these foci were counted.

S. W. THURBER.



WAGNER, HENRY LEWIS: CONTRIBUTION TO PASSIVE IMMUNIZATION IN DIPHTHERIA OF THE UPPER RESPIRATORY ORGANS. (*Annals of Otology, Rhinology and Laryngology*, December, 1911, p. 827.)

The author made these experiments with two objects in view: (1) To study the effects of the antitoxins on diseased tissue when locally applied, and (2) to endeavor to prevent or modify the anaphylaxis following the use of high potential serum when applied in small quantities during the initial stages of the treatment.

When the patient did not show a perfectly clear picture of diphtheria, swabs were taken for examination and the nose and throat were then sprayed at fifteen minute intervals with the strongest serum combined with 3 per cent. watery solution of calcium chloride in the proportion of 1 to 2, 5,000 units being used in the first three hours. Later, the amount was determined by conditions, the intervals between sprays being lengthened. Special importance was attached to the spraying of the nose in order to affect the whole Waldeyer lymphatic ring. Where diphtheria was present the intense venous hyperemia became less in a few hours; the odor became less fetid; the subjective symptoms were improved and the disease was apparently localized and prevented from spreading. When diphtheria was distinctly present from the first examination, the subcutaneous use of antitoxin was added to the local method. Calcium chloride was added to prevent anaphylaxis. The author thinks that this local use of the usual antitoxins lessens the number of diphtheria germ carriers.

S. W. THURBER.

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## SURGERY.

HOMANS, J.: OSTEOMYELITIS OF LONG BONES. (*Annals of Surgery*, March, 1912.)

Homans prefers the more conservative treatment of osteomyelitis of the long bones in children, especially the weight bearing bones. The disease usually begins at the end of the diaphysis, but occasionally as a periostitis. The primary operation in the acute stage consists only in getting free drainage by uncovering the infected medulla freely, doing as little damage as possible to

the periosteum and the endosteum. He does not believe in complete resection of the shaft in the early cases, but only in the late cases in which total necrosis of the shaft has occurred. The X-ray is very valuable in the late stages to show the formation of involucrum and of sequestra, but is not so valuable in the very early stages because of the absence of any marked changes in the density of the bone.

CHARLES E. FARR.

CECIL, R. L., AND BULKLEY, K.: LESIONS PRODUCED IN APPENDIX BY OXYURIS VERMICULARIS AND TRICHOCEPHALUS TRICHIURA. (*Journal of Experimental Medicine*, New York,

Cecil and Bulkley found the oxyuris vermicularis or trichocephalus trichiura in 15 per cent. of the appendices of 129 cases of appendicitis in children. The oxyuris was found seventeen times, the trichocephalus but twice. Four of the appendices were gangrenous and fifteen showed only the catarrhal type of inflammation. In the latter the changes noted were: Distension of the crypts with mucus, hyperplasia of the lymph follicles, and in some cases a very moderate infiltration of the muscularis and serosa with leukocytes. In 13 of the 19 cases there were lesions of the mucosa unquestionably produced by the parasite. Of the remaining 6 cases 3 were so gangrenous that no specific lesions could be made out. The oxyuris was also found in 4 cases of catarrhal appendicitis in adults, but without specific lesions.

CHARLES E. FARR.

KIRMISSON, E.: DIVERTICULUM OF MECKEL OPENING INTO THE UMBILICUS. (PERSISTANCE DU DIVERTICULE DE MECKEL OUVERT A L'OMBILIC.) (*Bull. de l'Acad. de Méd.*, Paris, February, 1912.)

Kirmisson reports one of the rare cases of patent diverticulum of Meckel opening at the umbilicus. The infant was only a month old, but survived the operation, making an excellent recovery. This is Kirmisson's second case of the sort. Two other cases are on record in infants of less than a month, in which the same operation of excision of the diverticulum was performed successfully. There is always a possibility in these cases of a charge against the physician that he has tied in a loop of intestine while ligating the cord, but of course this is not possible, as strangulation would immediately follow any such procedure.

CHARLES E. FARR.

SIMMONS, C.: TWO CASES OF INTRACRANIAL CEREBRAL HEMORRHAGE IN THE NEWBORN RELIEVED BY OPERATION. (*Boston Medical and Surgical Journal*, January, 1912.)

Simmons reports 2 cases of subdural hemorrhage in the newborn relieved by the simple operation of incision through the coronal suture and allowing the blood to escape. One case was bilateral, the other unilateral. The earlier case is now over a year old and seems perfectly normal in every respect. The other case was but recently operated upon. Simmons gives a brief review of the subject, placing the credit for the operation upon Cushing, but believes that Cushing's osteoplastic flap is hardly necessary in these tiny infants. These patients usually die shortly after birth, or, if they live, epilepsy and spastic paralyses are likely to develop. The symptoms are simply those of cerebral pressure, the child is irritable, does not nurse, is pale and sickly. The respirations become shallow, the pulse rapid and full, any cyanosis may develop. There is no pulsation in the tense fontanelles. The blood comes usually from one of the large veins of the cerebral cortex, and is usually localized there, being greatest over the upper portion. Localizing symptoms may or may not be present. Lumbar puncture may clear up doubtful cases.

CHARLES E. FARR.

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### MEDICINE.

ROLESTON, H. D., AND MALONEY: PURPURA IN ACUTE INFECTIOUS DIARRHEA. A REPORT OF THE MEETING OF THE ROYAL SOCIETY OF MEDICINE HELD NOVEMBER 24, 1911. (*British Medical Journal*, December 9, 1911, p. 1,535.)

The author reports the analysis of 100 cases of acute diarrhea in infants. Purpura occurred in 11 of them and proved fatal. The average day on which it occurred was the twenty-fourth and seven days before death. It is therefore a late cachectic manifestation and of extremely grave prognosis.

RICHARD M. SMITH.

PISEK AND COFFEN: THE POLYGRAPH AS AN AID IN DIAGNOSIS OF CARDIAC CONDITIONS IN CHILDREN. (*American Journal of Diseases of Children*, February, 1912, p. 69.)

The authors report, with tracings, extensive investigations on cardiograms in children. They conclude that it is possible to

make satisfactory tracings in children and that this is a means of accurate diagnosis and of obtaining facts which cannot be elicited by ordinary means. The information is of value in prognosis and treatment and it should be more generally employed.

RICHARD M. SMITH.

BASCH, CARL, AND ROHN, ADOLF: PHYSICAL EVIDENCE OF THE THYMUS. (*American Journal of Diseases of Children*, February, 1912, p. 82. Translated by A. C. Soper, Jr.)

These authors discuss the literature to a considerable extent and describe the use of a special instrument for percussion and also of an open sound-magnifying phonendoscope as an aid to thymus percussion. He believes that the method described is the most satisfactory in outlining the area of the thymus.

RICHARD M. SMITH.

SMITH, ERIC BELLINGHAM, M.D., LOND., M.R.C.P., LOND.: A TYPE OF NERVOUS VOMITING IN CHILDHOOD. (*The Lancet*, December 23, 1911, p. 1,769.)

The author describes a condition which he considers not very uncommon yet frequently overlooked. It is non-periodic, persistent and except when properly treated may be of many weeks' duration.

Occurring during or just following a meal the vomiting is painless and effortless and has little or no effect on the general condition.

Neurotic inheritance is usual and the patient is likely to have some other functional disorder, such as enuresis, migraine, habit spasm, lenteric diarrhea and in some cases rheumatic diathesis.

Seven cases are reported, all of which showed some associated nervous trouble; one was rheumatic.

The causation is explained as due to inherited or acquired hyperexcitability of the stomach analogous to the bladder condition in enuresis.

The treatment is improvement of the underlying nervous condition, removal from improper surroundings, a little firm moral control, and in obstinate cases small doses of arsenic and opium before meals. The author gave liq. arsenicalis m j and tr. opii m j.

WILLIAM LYON.



BEUKER, O. H.: THE TUBERCULIN REACTIONS AND THEIR COMPARATIVE VALUE AS DIAGNOSTIC AIDS. (*Interstate Medical Journal*, December, 1911, Vol. XVIII., No. 12, p. 1,206.)

The intradermal tuberculin test is recommended by Beuker as a means of differentiating between active and latent tuberculosis. The technique is as follows: The place of inoculation over the biceps muscle is cleaned with alcohol; then with a sterile platinum needle and glass syringe, the eye of the needle pointing upwards, inject  $\frac{1}{10}$  c.c. of the following five solutions: Phenol,  $\frac{1}{2}$  of 1 per cent. for control; O. T.,  $\frac{1}{10000}$  mgrm., O. T.,  $\frac{1}{1000}$  mgrm., O. T.,  $\frac{1}{100}$  mgrm., O. T.,  $\frac{1}{10}$  mgrm., at a distance of 5 cm. from each other, and allowing the solutions slowly to infiltrate the skin, producing a small papule. A positive reaction appears in twelve to twenty-four hours and reaches its greatest intensity at the end of forty-eight hours. At this time there is a small central tubercle encircled with a zone of redness, shading off gradually into the healthy tissues. This zone of redness varies from 1 to 2 cm.

Beuker believes that the following conclusions are at present applicable until more precise methods are demonstrated:—

1. That we can demonstrate by the intradermal test, in doses from  $\frac{1}{10000}$  to  $\frac{1}{100}$  mgrm., nearly all doubtful and early cases of active tuberculosis.

2. If, after a  $\frac{1}{10}$  mgrm. injection no reaction occurs, we can exclude tuberculosis.

3. From reactions to doses between  $\frac{1}{100}$  and  $\frac{1}{10}$  mgrm., we can only conclude that latent tuberculosis is present.

J. HERBERT YOUNG.

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## THERAPEUTICS.

WOOD, HORATIO C., JR.: THE EFFECTS OF CAFFEIN ON THE CIRCULATORY AND MUSCULAR SYSTEMS. (*Therapeutic Gazette*, January 15, 1912, p. 6.)

The author has investigated the action of caffein in  $1\frac{1}{2}$  to 6 grain doses on blood pressure, cardiac action and pulse rate. In every instance there was a reduction in the pulse rate, but no appreciable rise in blood pressure, although there was some increase in the force of cardiac contractions. He believes that the great reliance placed upon caffein as a constrictor of blood ves-

sels does not rest upon scientific evidence. Apparently, however, caffeine does increase the vigor of the contractions of muscles and enables them to work more economically.

RICHARD M. SMITH.

ROGERS, LEONARD: THE USE OF HYPERTONIC SALINES CONTROLLED BY ESTIMATION OF THE SPECIFIC GRAVITY OF THE BLOOD IN INFANTILE DIARRHEA. (*British Medical Journal*, November 25, 1911.)

From his success in the treatment of cholera by the use of hypertonic salt solution Rogers tried this method in the treatment of diarrhea in infants. His hypertonic solution contains 120 grains of sodium chloride, and 4 grains of calcium to a pint of sterile water. He injects subcutaneously 7 ounces, repeating two or three times in the twenty-four hours until the specific gravity of the blood has fallen to a little below normal. He further gives from  $\frac{1}{2}$  to 1 grain of calcium permanganate to each pint of fluid with which the stomach and intestines are washed out. This method was tried in only a few cases, but the results were sufficiently promising to make further trials of great interest.

RICHARD M. SMITH.

SCHAMBERG, J. F., AND KOLMER, J. A.: THE TREATMENT OF THE VACCINATION SITE WITH PICRIC ACID SOLUTIONS. (*The Lancet*, November 18, 1911, p. 1,397.)

Any proceeding which will aid in lessening the number of infections following vaccination is welcome. Bacteriologic and clinical investigations have been made as to the value of local application of picric acid to the arm following vaccination. The bacteriologic examinations showed that picric acid as a disinfectant is four times as efficacious as phenol. Applied to the site of vaccination as a 4 per cent. alcoholic solution forty-eight hours after vaccination, the picric acid in no way interferes with the efficacy of the vaccine virus. Of 22 children so treated, the vaccine "took" in 20 cases. The application of the picric acid toughened the skin over the site of vaccination and prevented rupture and infection of the lesion. The drug was painted on daily. The treatment was considered to lessen the degree of local inflammatory reaction, to reduce the liability to constitutional disturbance, to harden the epithelial covering of the lesion and decrease liability to extraneous bacterial infection.

T. WOOD CLARKE.

## BOOK REVIEWS.

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THE INTERNATIONAL MEDICAL ANNUAL, 1912 ISSUE. A YEAR-BOOK OF TREATMENT AND PRACTITIONER'S INDEX. Thirtieth year. New York: E. B. Treat & Co., 1912.

We can but say again in looking over the current volume of this standard review of medical progress that no other work occupies quite the same place in the physician's library. Although it is of English origin and the reviews are in large part by English authors, there are articles by such well-known Americans as John B. Deaver, M.D., Percy Fridenberg, M.D., D. B. Pfeiffer, M.D., and George L. Richards, M.D.

Messrs. Treat & Co. have done well to obtain the American rights to this work and issue it as they have done these many years. Its possession enables one whose time is well taken up to obtain the latest and most accurate information upon progress in therapeutics, and the possession of the volumes for several years permits of the rapid review of the course of medical advance. In research work it has been of great use, for the bibliographies appended to the articles are well done and serve as a good point of departure in looking up the literature of any desired subject. As has been the custom for several years, the department of diseases of children is under the editorial charge of Dr. George F. Still, which insures an authoritative handling of the subjects embraced therein. Altogether a work of value, we recommend it to our readers.

FORTY-THIRD ANNUAL REPORT OF THE CHILDREN'S HOSPITAL, HUNTINGTON AVENUE, BOSTON, FOR THE YEAR 1911. Boston, 1912.

This is a most interesting report of an excellent institution. The medical and surgical reports, and the orthopedic and throat as well, are instructive reading as representing the current practice in this institution which, from its relation to the Harvard University Medical School, may be taken as an index of the teaching there.

# ARCHIVES OF PEDIATRICS

MAY, 1912.

ROYAL STORRS HAYNES, PH.B. M.D.,  
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## EDITORIAL.

### ARTICLES ON INFANT FEEDING

It is very satisfactory to see, in the articles which appear from time to time on the subject of feeding, less dogmatism, less partisan spirit, and a greater appreciation that those who have written before have been right in part, if not wholly, and that the consideration of the individual child must be the real basis of all successful feeding. We do not find so frequently on the one hand the advocate of extremely high fats, on the other the man to whom all fat is poison; less often is the caloric method reviled and the percentage method extolled, or *vice versa*; not so often are the systems of America contrasted with those of Germany to the advantage of the one and the detriment of the other; even the quarrel with heated milk is not so furious. Men



realize better that no one method is always successful, that the principles underlying successful artificial infant feeding are true whether they be expressed according to one method or another, in this language or in that. Departing from the fallacious idea that a milk modification must resemble mother's milk, many observers have accumulated a vast amount of knowledge upon the way the digestive tracts of normal and abnormal infants handle the various food substances brought to them; and what are the advantages and what the dangers of this or that food element, whether fat, carbohydrate, proteid or salt. In the accumulation of all this the pendulum has swung back and forward, and various methods of feeding have been elaborated by various men according to the extent of their experience, knowledge, sincerity and tolerance. Proteids have been feared and a goodly number of schemes devised to avoid the indigestible casein, only to lose their importance with the later recognition that casein is not so indigestible after all and that curds may be due to too much fat. Fat has been made to bear the burden of countless cases of intolerance until the dietist has been put to it to give his patient enough to eat to make him grow without the fat. And then fat indigestion, so-called, has been explained by the injurious action of the soluble portions of the milk serum which have been said to be the excitants of disaster, rendering the patient intolerant of fat. And finally the salt content is receiving in its turn its modicum of investigation. And so it goes, each year new light coming to show that so far the problem has not been fully met and that somewhere in the mean of all contentions the true principles lie.

Those who have contrasted the "caloric method" of feeding with the "percentage method," sometimes with considerable scorn, have usually been unaware that these are not methods of feeding, but methods of statement about feeding, serving to indicate what has been done, so that it may be repeated or variations made from it. When the experience of a great pediatricist is put down upon paper for the guidance of his students, it may be that it shall fall into the form of certain amounts of milks of various

percentages, or it may be of milks of different caloric values, or in amounts of milk (or cream) and water, lime water, sugar of milk, or what not. His "method" is the way he uses his fats, carbohydrates, proteids, salts and water to make a food which will be palatable, digestible, assimilable and sufficient for his patient.

The student of infant feeding has been confused by the lack of uniformity in the various teachings and their lack of availability. So many articles have been written, so much teaching has been done serving only to show the reader or student how different foods may be combined, how different percentages of fats, etc., may be obtained, how gruels may be dextrinized, how proteid may be split, without attempting to teach how these tools should be properly used. Too many men are feeding their babies according to "Dr. Blank's formula" and not by the indications of the case. They have industriously acquired what he has done in certain cases, but have not learned why he did it. What is necessary is to teach how intolerance of any food may be recognized and the factor at fault determined. The problem of vomiting, for instance, needs for its proper handling a comprehension of the curdling of milk, of the arrangement of the curd in the stomach, of the capacity of the stomach, of the chemical control of pylorus and cardia, of the retarding effects of high fats, of the proper intervals to insure an empty viscus. The physiologist and the writer of articles on experimental medicine do more to further the problem than the writer of the ordinary article on feeding, especially that which is replete with formulas or lays down exact and unalterable rules.

Now and then an article appears which does teach the reason why or which tells new facts or old ones in new form. Such an article we believe Dr. Ladd's, which we publish this month, to be, and we are very glad to be able to present to the readers of the ARCHIVES an article which states present-day ideas of the feeding problem in so broad-minded a way and brings new experimental evidence to bear upon one of the most difficult and distressing phases of the question.

## ORIGINAL COMMUNICATIONS.

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### STUDIES IN THE NUTRITION AND DIGESTION OF INFANTS.\*

BY MAYNARD LADD, M.D.,

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The subject of infant feeding and nutrition is the keystone to modern pediatrics. It has been, and is, a source of much contention. In spite of all the contradictory theories which are held, I think we will all agree that the artificially-fed baby today has a much better chance for life than it had twenty years ago.

The ultimate purpose to be kept in mind in the feeding of infants is normal growth and development. This implies normal digestion, a steady and progressive gain in weight, a good appetite, freedom from discomfort when awake and quiet and restful hours of sleep. Only when all these conditions are fulfilled can we be satisfied with the feeding.

The paper I present to you tonight is a clinical study of 82 infants with varying grade of indigestion and malnutrition. They are not strictly consecutive, nor are they selected cases. I think I may say that they are fairly representative of our experience in the treatment of the difficult feeding cases as they are seen in a large out-patient service. My chief object has been to show what may reasonably be expected from intelligent adaptation of milk to individual requirements, and secondly to study the relative value of different types of food in the substitute feeding of infants. Statistics of feeding cases must give the result of treatment extending over several months to be of value. The milk supply should be from one source and the accuracy of the mixtures guaranteed within reasonable limits.

All of the cases reported in this series were fed upon milk from the Walker-Gordon Laboratory. The observations were considered closed when for one reason or another the milk from

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\* Read by invitation before the Philadelphia Pediatric Society, February 13, 1912.

this source was discontinued. Many of the infants are still under observation. One may be reasonably sure of the accuracy of the percentage modifications and also that the amounts did not exceed that prescribed. I cannot assert with positiveness that the quantity was invariably taken in full, as I was dependent upon the statements of the mothers in regard to this point.

In this country the development of the art of infant feeding has been along the lines of percentage modification of cow's milk. Originally the idea underlying this system was the effort to so modify the composition of cow's milk that its percentage of fats, sugar and proteins should resemble the composition of breast milk. The amount of each feeding, the intervals between feedings and the total number of feedings were adapted to the individual requirements of the child on the basis of the experience gained in breast-fed babies. It was soon evident, however, that artificial or substitute feeding was a much more complicated problem. Cow's milk modified to the composition of breast milk often failed to nourish infants properly, especially when their digestion and nutrition had been lowered by weeks and months of unsuccessful feeding. This led to much experimentation with modified milk formulæ varying greatly in composition from that of breast milk.

The pediatricists of Europe attacked the problem from quite a different point of view from that of the American workers. Their investigations ignored, for a time, the influence of the different elements of milk in digestion and nutrition. They determined the caloric value of breast milk and reduced the factors to the required calories per kilogram of baby weight, the so-called "energy quotient." The quantity of food was reduced to an amount proportionate to the body weight. The calories were supplied by the use of whole milk, with the addition of sugar or carbohydrate in some form. No effort was made to make any fine distinction between the different elements of the food. As long as the food had the proper energy value and was sufficiently diluted, it was made to serve its purpose.

Within recent years, however, we have been aware of changes in the German methods as well as in our own. We, in America, have been giving more attention than formerly to the caloric value of our percentage combinations. On the other hand the



Germans have been studying the effects of variations in the elements of the milk from which the calories are obtained.

There should be no conflict between percentage feeding and feeding based upon calories. Both methods attempt to express the value of a food in intelligible terms; the first expresses the composition of the food in percentage of its elements; the second gives the fuel value of the mixture as a whole. It is self-evident that no infant can be fed exclusively upon either fats, carbohydrates or proteins; it must have all three elements. Percentage feeding simply expresses in a form easy to understand the ratio between the fats, carbohydrate and proteins; that is, the balance of the mixture.

The "energy quotient" is simply a means of stating the fuel value of the food as a whole, in terms of calories, to each kilogram of body weight.

I emphasize the importance of the percentage modification of milk because the method is continually subject to criticism by writers who appear not to have grasped the idea that it is simply a means of accurate prescription of food elements. The knowledge of what the food contains is the first and most important point in successful feeding. It gives us the latitude and longitude, so to speak, by which we guide the course of the infant through its first critical year. To my mind, it is inconceivable that anyone could consider it a disadvantage to know the strength of his formulæ as expressed in percentage and calories. The physician who feeds his babies upon cow's milk diluted with water, and adds some sugar, is giving definite percentage of fats, sugar and proteins; he is giving a modified milk in short, but if he does not think in percentage he has a vague idea of the food value of his mixtures. It is not a matter of importance whether one obtains a given mixture by diluting "whole milk," "top milk," or "cream," providing one knows the proportions necessary to give the desired mixture. The essential thing is to think in percentages and to have at one's command a method of calculation which will enable one to determine these percentages.

Too little distinction is made by the critics of percentage feeding between the calculation of the food formula and the adaptation of the food to the infant's individual needs. In regard to the adaptation of the modification, so many different theories are held that much confusion exists among physicians as

to what are the essential principles of infant feeding. This confusion of opinions in the end discourages the inexperienced student who is trying to master the subject of scientific feeding.

Much of the misconception of the American system of feedings originates, it seems to me, in the rules for feeding which are given in all the text-books to cover the requirements of the average healthy infant. One naturally rejects the idea that nature has designed that all infants of a given age should have a fixed ration of fats, sugar and proteins, for one's experience is very much to the contrary. There is a great variation in the food requirements of different infants, variations, dependent upon age, weight and difference in capacity of digestion and assimilation. The rules I refer to are approximately correct for the average normal healthy infant, but are not intended to be a guide for the sick or badly nourished child—the so-called—"difficult feeding" case. They are rules based upon averages and as such may or may not be applicable to the individual case.

With equal reason one may fairly object to tables giving the caloric requirements of infants in terms of the energy quotient. These rules, too, are based upon the average of many observations, and are often far from accurate when one is considering the food requirements of any particular infant who is suffering from indigestion and malnutrition.

There are individual factors in every difficult case of feeding which can only be determined by careful study and experimentation. The chief of a children's clinic must give his personal attention to his feeding cases to gain results; if he leaves the management of his old cases to the average inexperienced house officer, while he studies the new and interesting patients, he inevitably finds the general results discouraging and himself growing skeptical as to what may be accomplished. This supervision of the old feeding cases must be sincere and detailed and not perfunctory. The individual factors in these difficult feeding cases are varied and full of interest and often give the clue to successful feeding. In fact, they are so important that the problem of teaching students how to feed babies cannot be solved by explaining general principles, but must be reduced to daily and weekly and monthly observation of the reaction of each child to the various changes in the percentage composition and the caloric value of the food. A knowledge of what the average healthy

baby requires is necessary for the successful feeding of normal healthy babies. But in the difficult feeding cases, which are the real test of our skill, one must always be prepared to throw aside the rules based upon averages, to disregard some things one may have accepted as axiomatic and to do the thing which will produce the ultimate results, which must always be the proper growth and development of the infant.

Perhaps the most interesting of all difficult cases of feeding is the group known as infantile atrophy or marasmus. We may not all agree to just what infantile atrophy means. Presumably it represents a state of emaciation dependent upon disturbances in metabolism, which may or may not be associated with symptoms of indigestion, and is not to be attributed to the result of any specific infection such as tuberculosis and syphilis.

Admitting exceptions, I believe the great majority of these cases are due to long continued improper feeding, the symptoms of indigestion varying according to whether the infant has on the whole been overfed or underfed. An infant must gain in weight with reasonable regularity. Any food, whatever its composition and amount, which fails to produce such gains, must be looked upon as an "improper" food for that particular child. Diametrically different types of food may produce the same extreme state of malnutrition. We have all seen for instance, practically the same degree of emaciation in three babies; one wholly fed upon an insufficient and weak breast milk, one on excessively strong modified milk, one on an excessively weak modified milk. The cases which have been overfed present the greatest difficulties, because these are likely to show greater gastric intolerance.

It is commonly stated that these cases of infantile atrophy will not tolerate fat and only too often this assertion is taken so literally that no effort is made to create a tolerance for fat. If reasonable percentages of fats can be digested, the problem of making the child gain weight is much simplified. Without the use of fats, the required number of calories must be obtained from carbohydrates and proteins. The excessive use of either may result in serious disturbance of digestion or nutrition. It is surprising to see what can be accomplished in the upbuilding of the fat digesting functions in many of these cases. Only by trial, can one say whether or not these infants can digest and assimilate fats. Obviously the fats must be kept low at the be-



ginning and sometimes for considerable periods, but it is my personal belief that we have carried our fear of fats to an extreme, and often to the detriment of the infants' nutrition.

There are two points which I believe to be essential which have been little emphasized in the discussion of infant feeding. I refer first to the fact that if the percentage of any one element the food is pushed beyond the child's ability to digest it a condition results which affects unfavorably the digestion of all the other elements; second, if one element, such as the fat, is kept very low, much higher percentage of the sugar and protein can be given, and conversely if the protein and sugar are kept relatively low, higher percentages of fat can be given. Young infants, for instance, may digest the full protein of milk, if the fats are excluded, but if the fats are raised to that of whole milk, neither the proteins nor the fats are then digested. A digestive crisis results. As the object of feeding is to make the infant gain in weight and development, it is our duty to find the proper balance of food to produce this result and the whole purpose of percentage feeding is to render the adaptation of the different food elements more accurate and scientific than where mixtures of varying and unknown strength are used.

It has also seemed to me that the question of fat digestion and assimilation is not wholly one of the fat percentage of the food or of the total fat in grams. The digestibility of the fat depends largely upon the rest of the mixture. If more attention is given to the character of the carbohydrates and to the administration of the casein in a form easy to digest and assimilate, less trouble is experienced in building up the fat digestive functions in these severe cases of atrophy.

Equally important with this balance, or percentage composition of the food, is the regulation of the quantity to be given at each feeding, the intervals between feedings and the number of feedings in the course of twenty-four hours, for on the total quantity consumed depends the caloric intake.

According to Finkelstein and Meyer the indigestibility of cow's milk is due not to the fats and proteins but to the constituents of the whey, they believe that the fermentation of the whey is the chief factor in the production of the diarrhea of infants. As a result of their experiments they conclude that the milk sugar of whey is the cause of the fermentation and that casein has an anti-fermentative action. They therefore have



prepared a food which is called "eiweismilch," which is made as follows:

The casein of whole milk is coagulated by the addition of pepsin. The whey is strained off from the casein and the curd is minutely subdivided by pressure through a fine sieve. To this is added one pint of water and one pint of buttermilk, giving a food which has a composition of

Fats .....	2.5 per cent.
Milk sugar.....	1.5
Protein .....	3.0
Mineral water.....	0.5

When the diarrhea is under control they increase the caloric value of the food by the addition of carbohydrate, preferably in the form of malt sugar, in order to make the infant gain in weight.

There can be no question that the eiweismilch is a much more digestible mixture than an ordinary modification of milk which has the same composition. The difficulty of protein digestion is not due so much to the percentage of protein as to the form in which it is administered. The first step in the digestion of milk is the coagulation of the casein, the curd which forms being entangled with the fat. As the casein is digested the fat separates and is then subjected to its own digestive process. In the eiweismilch there is no curd formation, no entangling of the fat in its meshes and both fats and casein are therefore much more free to be acted upon by the gastric and intestinal juices than in an ordinary cream mixture of the same composition. The very low percentage of milk sugar in the eiweismilch must also be a factor in increasing the digestibility of the casein, as it is a fact of common experience that when any one element of the food is greatly reduced, the remaining elements are more easily digested. We should never lose sight of the fact that the effects from any food is the result of all the elements which make up that food. The same effect may be produced by several different mixtures, an explanation which accounts for many differences of opinion as to the causes of indigestion and the best method of correcting it.

The inconvenience of preparing the eiweismilch is a serious objection to its use if something else will act equally well or

better. Admitting its usefulness in the acute stage of a diarrhea, there remains the question, whether it is a suitable food to use in the cases of long continued indigestion with malnutrition. One can form an opinion on this point only by comparison of statistics of the result obtained by various methods of feeding.

The infants included in this series have been studied in five groups:

(1) One fed upon low fats and subsequently upon increasing percentages of fats, the mixtures varying in character but not containing maltose;

(2) A series fed upon whey mixtures, the excess of sugar being lactose;

(3) A series fed upon whey mixtures, the excess of sugar being maltose;

(4) A series fed upon plain cream and barley mixtures with the excess of sugar maltose, the whole being raw, and

(5) A series similar to group four but the mixture being heated to  $212^{\circ}$  F.

#### GROUP I.

In this group are included 8 cases who were fed on formulæ which in general were low in fats, high in carbohydrates and moderately high in proteins. The observation upon the effect of low fat feedings were carried on for a period varying from one month to two and three-quarter months, the average being one and three-quarter months. The average strength of the milk at the end of this first period of low fat feeding was

Fat .....	1.75 per cent.
Milk sugar.....	6.00
Proteins .....	1.50

The amount and number of feedings varied according to the infants' ages and states of development. The rate of gain during this period of low fat feeding was only eight ounces per month.

The same eight infants were then fed with a view to increase the percentage of fats. Starting with the formula used at the end of the period of low fat percentages, the food was gradually increased in strength, the quantity also being increased in proportion to the gain in weight. The observations were carried on

for periods varying from two and one-quarter to seven and three-quarter months, the average being three and three-quarter months. The average strength of the milk at the end of this second period of observation was

Fat .....	3.87 per cent.
Milk sugar.....	6.75
Protein .....	1.92
Barley starch.....	.75

Following this change in policy of feeding, these infants who had gained so slowly on low fats, began to take on weight rapidly, the rate of gain generally increasing as the percentage of fat was raised to 3.5 and 4 per cent. The average gain in the three and three-quarter months of observation was at the rate of eighteen and one-third ounces per month, compared with the eight ounces per month when the fats were kept below 2 per cent. In other words, it was possible by careful and gradual regulation of the feeding to develop the fat digestion in these eight infants who were supposed to have intolerance for fats. I admit the truth of the suggestion which may occur to some of you, that the six weeks of low fat feeding was a considerable factor in the results obtained in the second period of observation, in that it provided a prolonged rest to the fat digesting functions. The point I wish to make, however, is that in all cases of indigestion and malnutrition, the period of low fat feeding or total exclusion of fats need not be carried to the extreme sometimes advocated. I am also convinced not only by the results obtained in the 82 cases which I have tabulated in this paper but by many similar studies, that a percentage of 3.5 to 4 of fat is not an excessive amount to put in an infant's food, provided that the increase is made gradually and that the mixtures do not contain excessive percentages of carbohydrate and protein.

The rapidity with which these limits can be reached, however, varies greatly and can be determined only by careful study of all the factors of digestion and nutrition in each case. It is safer to underfeed than overfeed a baby, but as pediatricists, we have no excuse to fall into either extreme, except as a means of getting our bearings, so to speak, with a view as to how best to proceed with the feeding.

I have no doubt that much of the feeling against fats arises from three causes.

First: too rapid increase in the fat percentages.

Second: errors in the composition of the formulæ, due to unsuspected variations in the strength of the milk or cream used, and to errors in calculation and mixing. It is a very common experience to find 5 and even 6 per cent. of fat in modifications which have been supposed to contain 3.5 to 4 per cent.

A third source of error is the neglect to appreciate the importance of the proper balance between lime salts and fat in the digestion of fats. Fermentations from any cause favor the production of fatty acids, the neutralization of which is dependent upon sufficient quantities of lime. Larger quantities of lime are needed than are present in cow's milk. If the fatty acids are not saponified they act as irritants to the intestines, and so interfere with normal pancreatic digestion.

In all cases of malnutrition with gastric and intestinal indigestion, lime water amounting to 5, 10 or even 15 per cent. of the total mixture, is, I believe, an important factor in favoring fat digestion, by forming an insoluble soap with the excess of the fatty acids. In all the cases reported in this series, I have used these amounts of lime water in the early stages, reducing the percentage as the stools began to show a tendency to constipation. It is not enough in many cases to add lime water in quantities sufficient only to neutralize the acidity of the milk and cream used. Whatever the method of feeding one may use, the conditions necessary to normal digestion and assimilation is absence of fermentation and proper saponification. The influence of lime salts on the saponification of the fatty acids has been shown in a recent paper by Stolte.

## GROUP II.

Twenty-four of the 82 cases were fed for the greater part of the time on whey mixtures, in which the whey protein was quickly advanced to the maximum of 90 per cent., and the excess of sugar which raised the total percentage to 6.5 or 7 was added in the form of milk sugar. These cases were observed for periods varying from two weeks to six months, the average being a little more than two and one-half months. Taking the groups as a whole, the average gain per month was eighteen ounces.



The cases fed for several months showed the greatest gain in weight, a considerably higher rate than is represented by the average. The explanation undoubtedly is to be found in the higher percentages of fat one was able to give after several months of careful feeding. With an occasional exception every child who was followed for as long as two months was able to take 3 per cent. of fat or over, and at the end of the period of observation, most of them were taking 3.5 to 4 per cent. of fat. I have charted the results in the cases which were longest under observation. The undermining influence of the whey elements and milk sugar, if there is any, should show best in the infants who were on the whey mixture for the longest time.

By comparison with the results in Groups III., IV. and V., it will be seen that the rate of gain on whey mixture with lactose was from three and one-quarter to four and two-thirds ounces less per month, but nevertheless, the results were, taking the group as a whole, satisfactory, especially when one considers the condition of the infants when the feeding was begun.

### GROUP III.

The cases in Group III., in contrast with Group II., were fed upon whey mixtures, the excess of sugar over and above that contributed by the whey being maltose. There were 10 cases in the group. They were all started in the fall of 1910, and the period of observation was longer than in the majority of the cases in Group II. The average period of observation was 6.5 months. The average gain per month in this group was twenty-two and two-thirds ounces. Six of the 10 cases toward the end of the period were put upon total protein mixtures. These gained two ounces more per month than the remaining four; a rate of gain which may have been due to the change in the protein or to the fact that they were fed for nearly a month longer. It is thus clearly demonstrated, as far as the cases in Groups II. and III. are concerned, that the addition of the malt sugar to a whey mixture in place of milk sugar increases the rate of gain. In this series it amounted to four and two-thirds ounces more per month, that is an increase of 26 per cent. As the percentage of fats and sugars average the same as in Group I. (3.5 to 4 per cent. fat and 6.5 to 7 sugar at the end of the period), the greater

rate of gain must be attributed to the advantage procured by the use of maltose in place of milk sugar. On the other hand, the cases in both of these groups (II. and III.) showed no deleterious effects from the prolonged use of the whey elements, as indicated by the average rate of gain of eighteen ounces a month. The preparation of maltose used contained 88 per cent. of carbohydrate, consisting of 57.1 per cent. maltose and 30.9 per cent. dextrin.

#### GROUP IV.

In this and the following group (V.) the mixtures were almost wholly plain cream mixtures with .75 to 1.00 per cent. barley starch, and malt sugar added to obtain the higher percentage of carbohydrates necessary for proper gain in weight. The fats were in the beginning started at very low percentages, but the object always in view was to raise the percentage to 3—3.5 or 4 per cent. by the gradual development of the fat digesting functions. The sugars were as a rule quickly advanced to 6—6.50 and 7 per cent., the proteins to 1.50, 2.00 and rarely 2.5 per cent. The starch was generally .75 per cent. and obtained from barley flour. The lime water was generally 10 per cent. of the total mixture, unless the stools became constipated, which they rarely did when maltose was used. In both groups the gain in weight was slowest at the beginning of the feeding when the fat percentages were necessarily low. It was greatest when one was able to give 3 per cent. or more of fat, which with occasional exceptions one could do after one and one-half to two months of careful feeding.

The only distinction of importance between the two groups was that in Group IV. the milk mixtures were given raw, while in the Group V. they were superheated at a temperature of 212°F. for twenty minutes. As I had more faith in this method of superheating the milk I started the most difficult cases upon the superheated milk, a point of possible importance in judging of the comparative results.

In Group IV. there were 18 cases observed for periods of from two weeks to six months, the average being two months. The average rate of gain was  $21\frac{1}{4}$  ounces per month.

In Group V. there were 23 cases observed for periods varying from two weeks to five months, the average being two and one-

half months. The average rate of gain was  $21\frac{1}{4}$  ounces per month, exactly the same as in Group IV.

The use of the malt preparations with barley were thus shown to exceed in efficiency the plain cream mixtures in Group I. and the plain whey mixtures with milk sugar in Group II. The whey mixture with malt sugar gave a monthly gain of twenty-two and two-thirds ounces; the difference in rate of gain in the three types of malt mixtures was so slight as not to be conclusive. A larger number of cases, or a longer period of observation might change the result. The advantage of maltose over lactose in supplying a deficiency of carbohydrate is, however, very evident, amounting to from 18 to 26 per cent. greater rate of gain per month.

#### GROUP V.

I was interested to see if it could be shown that the use of a cooked milk mixture was in any way an advantage or disadvantage in the preparation of an infant's food. Clinically I had observed that when cream and malt mixtures with barley were too laxative the process of superheating the mixtures made it unnecessary to cut down the percentage of malt and fats, and I was therefore able to manage the feeding with less interruption in the weight development.

The results obtained by the use of superheated malt mixture seems to disprove the theory sometimes expressed that the use of a boiled milk mixture is of itself deleterious to infants. Taking the group as a whole, superheating the milk neither increased nor diminished its nutritive value as far as one could judge from the gain in weight. In individual cases, however, as will be seen in the charts, its substitution for a raw milk was often followed by an increased rate of gain.

The infants in Group V. as a whole represented the severest cases of malnutrition in the series. That they gained as much as those in Group IV. is, if anything, a point in favor of its use, more particularly when the results from other methods failed to produce results.

The mechanical action of the starch in breaking up the curds into small flocculent masses, thus favoring the digestion of both casein and fats, has long been recognized. This effect appears to be increased by the action of heat.

There are several things to remember in connection with the



use of malt and cereal superheated mixtures. The action of the malt is naturally laxative; if it becomes too much so, in spite of boiling the milk, the use of 10 or even 15 per cent. (of the total mixture) of lime water and bismuth seems to control the frequency of the movements. If this fails, the percentage of maltose must be reduced. Three or four movements a day at first are frequently noted, but the stools are smooth and homogeneous, and there appears to be no disturbance in the general condition of the infants nor any interference in the rate of gain, a condition analogous to certain breast-fed infants who gain regularly even when having four to six movements daily.

The possibility of scorbutus naturally suggests itself in connection with the use of a superheated malt mixture. It is, however, as practical to prevent the development of scurvy by small daily doses of orange juice as to cure the disease by large doses when it has once appeared. After four or five weeks of use of a superheated milk, it is a wise precaution to give one to two teaspoonfuls of orange juice daily as prophylaxis. If this is done a boiled milk may be given for months without the slightest sign of scorbutus.

There is nothing original in this method of feeding. It is simply combining the principle of malt soup mixtures with percentage modifications of milk, using the malt soup preparation as the basis of the food and gradually increasing the percentages of fat and proteins to meet the requirements of the individual case. It is my belief that many babies to-day are being underfed in fat percentages, a natural reaction from the excessive fat feeding which at one time prevailed and which is still practiced by some pediatricists. Any method which appears to stimulate the digestion and assimilation of fats is preferable to methods which involve the total exclusion of this important element in the food. It is well to remember that the most successful of all feeding—breast milk—bears a relation of fats to proteins of 4 to 1.50. Of this protein only 0.50 to 0.75 per cent. is casein. Cow's milk modified is not breast milk, but the knowledge of the composition of breast milk carries its lesson nevertheless.

It is only fair to state that the result obtained in these 82 cases should not be compared with the results of treatment of severe acute fermental diarrhea and infectious diarrhea. As my service at the hospital begins in October, the cases coming to the clinic represent for the most part infants with extremely low



TABLE I.

## SUMMARY OF CASES IN THE SERIES.

Number of Case	GROUP I.						GROUP II.			GROUP III.			GROUP IV.			GROUP V.		
	Low Fats			High Fats			Whey Mixtures			Whey Mixtures			Plain Cream Mixtures c' Barley			Plain Cream Mixtures c' Barley		
	First Period			Second Period			Excess Sugar Lactose			Excess Sugar Maltose			Excess Sugar Maltose Not Heated			Excess Sugar Maltose Heated 212° F. 20'		
	No. Months		Gain	No. Months		Gain	Months		Gain	Months		Gain	Months		Gain	Months		Gain
	lbs.	ozs.		lbs.	ozs.		Months	lbs.	ozs.	Months	lbs.	ozs.	Months	lbs.	ozs.	Months	lbs.	ozs.
1	2¾	0	3	3¾	7	15	¾	1	7	7	11	5	6	5	3	3	3	2
2	2¾	1	4	2½	5	6	¾	0	13	6	7	15	3	4	10	4¾	6	10
3	1½	1	4	3¾	5	11	2½	2	6	6	7	5	2	5	12	2½	5	2
4.	2	0	14	3½	7	12	¾	0	13	6	10	2	½	0	2	4	4	8
	1¾	0	14	7¾	11	7	1	1	0	5	10	4	3	3	8	3	1	0
6	1¾	0	10	3	5	13	½	0	1	8	9	12	3¾	2	6	1¾	3	0
7	1	0	1	2¾	3	7	3	4	0	7	8	10	¾	0	8	1¾	1	12
8	2	1	4	4	7	13	1	1	0	5	3	13	¾	0	12	2¾	4	14
9	.....	.....	.....	.....	.....	.....	½	0	2	6	10	5	½	0	12	2¾	1	15
10	.....	.....	.....	.....	.....	.....	¾	0	8	9	13	3	2¾	3	12	3¾	3	10
11	.....	.....	.....	.....	.....	.....	1¾	1	14	.....	.....	.....	1¾	4	0	1¾	3	12
12	.....	.....	.....	.....	.....	.....	2½	4	1	.....	.....	.....	1½	1	7	3¾	3	14
13	.....	.....	.....	.....	.....	.....	5	4	14	.....	.....	.....	3	4	12	2	2	13
14	.....	.....	.....	.....	.....	.....	4¾	2	10	.....	.....	.....	2¾	3	1	3	4	5
15	.....	.....	.....	.....	.....	.....	3¾	3	4	.....	.....	.....	1¾	3	11	1	2	7
16	.....	.....	.....	.....	.....	.....	1¾	1	7	.....	.....	.....	1	0	5	2	2	12
17	.....	.....	.....	.....	.....	.....	2	2	5	.....	.....	.....	1	1	0	1¾	0	14
18	.....	.....	.....	.....	.....	.....	1¾	0	13	.....	.....	.....	2	3	11	1	0	0
19	.....	.....	.....	.....	.....	.....	5	5	3	.....	.....	.....	.....	.....	.....	2	2	15
20	.....	.....	.....	.....	.....	.....	1¾	1	7	.....	.....	.....	.....	.....	.....	1¾	2	15
21	.....	.....	.....	.....	.....	.....	6	9	1	.....	.....	.....	.....	.....	.....	5	10	0
22	.....	.....	.....	.....	.....	.....	6	7	5	.....	.....	.....	.....	.....	.....	1½	1	3
23	.....	.....	.....	.....	.....	.....	3¾	5	3	.....	.....	.....	.....	.....	.....	1½	1	13
24	.....	.....	.....	.....	.....	.....	5½	6	0	.....	.....	.....	.....	.....	.....	.....	.....	.....
Average months	1¾	.....	.....	3¾	.....	.....	2½	.....	.....	6½	.....	.....	2	.....	.....	2¾	.....	.....
Gain per month in ozs.	8	.....	.....	18½	.....	.....	18	.....	.....	22½	.....	.....	21¾	.....	.....	21¾	.....	.....

nutrition and impaired digestion as a result of acute diarrheas, or long continued improper feeding.

#### CALORIC REQUIREMENTS OF ATROPHIC INFANTS.

If one studies critically the energy quotients in the charts presented in this series, certain general tendencies are observed. As a rule, the infants did not begin to make steady and satisfactory gains in weight until the energy quotient was raised to a point much above that which is given as the average of the healthy infant. An energy quotient of 140 to 160 appears to represent a fair caloric requirement; often it was necessary to raise the energy quotient to 175 or 190, but as the infant gains in weight a lower range of caloric requirement is noted. In general one may say that the energy quotient is greatest when the weight development is farthest from that of the average normal infant as determined by the weight chart.

When the infant's weight approaches that of the normal case, its energy quotient averages about 125. In this series one sees exceptional cases of progressive gain in weight in atrophic infants when the energy quotient is under 100, but a continued observation for four or five months would eventually demonstrate a greatly increased caloric requirement. After a period of prolonged starvation without severe digestive disturbances, a very weak food is largely assimilated and for a time the gain in weight is rapid, but to maintain this rate of gain for a long time it is necessary continually to increase the energy quotient, until the infant approaches the normal weight curve.

It is safest to begin the feeding in difficult cases with an energy quotient in the neighborhood of 110 and to raise it every three or four days until the gain in weight is started. When this point has been reached the caloric requirement should be determined by the rate of gain and the state of the digestion and not by reference to rules for the energy quotient based upon averages. One will observe a variation in an infant's need for calories as pronounced as its ability to digest and assimilate different proportions of the milk elements.

#### GASTRIC CAPACITY OF ATROPHIC INFANTS.

For a long time I have been convinced from clinical observation that the quantity at each feeding could not be based wholly

upon the weight of the infant as advocated by many writers. A baby one week old weighing eight pounds will be satisfied with ten to twelve ounces as a daily ration. This quantity will not be sufficient however for an infant of six months of the same weight.

The quantity of food to be given at a feeding to an infant who is greatly under weight is often a difficult question to answer. An atrophic infant of six months weighing seven or eight pounds has a greater gastric capacity than the normal healthy infant of the same weight, for the exercise of the functions of digestion has developed the stomach and intestines out of proportion to the weight development of the body as a whole. The gastric capacity is nearer to that of the age of the infant than it is to the capacity of the stomach of the normal, healthy infant of the same weight. If the charts I shall show are carefully studied, one is impressed by the relatively large amount of food some of these infants require at each feeding in order to satisfy their hunger and at the same time bring about a satisfactory rate of gain. Statistics based upon averages are always misleading when applied to any individual case, but they do give interesting and valuable data as to conditions in general.

In the 22 cases, the charts of which I have shown, I have tabulated the quantity at each feeding by months, averaged them and compared them with the amounts for the average healthy infant of the same age. (Table II.) The average of the infants fed in this series followed very closely the amounts which would be given to the average healthy infant of the same age. In contrast to these figures, I would call your attention to Table III., showing (1) the relation between the quantity taken at each feeding and the weight of the infant in pounds, and (2) the comparison between these amounts and those which would be given to the average healthy infant of the same weight.

TABLE II.

Showing the average amount in ounces at each feeding according to age.

	Months.											
	1	2	3	4	5	6	7	8	9	10	11	12
I. Normal healthy infants —	3¼	4	4½	5½	6	6½	7	8	8	9	9	
II. Cases shown in charts —	3	3½	4¼	5¼	5¾	6¼	6¾	7	7	7½	7¾	

TABLE III.

Showing comparative amounts taken at each feeding by atrophic infants in the series and normal healthy of the same *weight*.

Normal average infant weighing at			Infants in this series of corresponding WEIGHTS received on an average.	
		Lbs.	Ounces.	Ounces.
1	week	6	1	3¼
1	"	7	2	4
3	weeks	8	2½	4½
5	"	9	3	4½
7	"	10	3	5½
9	"	11	3½	5¾
3	months	12	4	6¾
3½	"	13	4¼	7
4¼	"	14	4½	6
5	"	15	5½	6
6	"	16	6	6½
8	"	17	7	7
9	"	18	8	7¼
10	"	19	8	7½
11	"	20	8	7
12	"	21	9	7¾
13	"	22	9	8

The striking point brought out by these figures is the relatively large amount of food at each feeding required by the atrophic infant when its weight development is lowest. It often amounts to 1½ to 2 ounces more than would be given to the normal infant of the same weight. As the weight reaches that of the normal average this disproportion between the weight and the quantity at a feeding gradually disappears.

The comparison of the results in these two tables confirms my own belief that the quantity of food to be given an atrophic infant is only a little under that which the normal infant of the same age receives, and is considerably more in amount than that which is normal for the healthy baby of the same weight.

Obviously, such a table must be used with strict regard to the individual child's requirements, for here again we are dealing with averages. The quantity, like the quality, of the food must in the particular infant be determined by careful clinical observation of all the data on which the feeding is based.

The state of nutrition of these babies can be best indicated by typical weight charts from each group. I have selected charts from the cases in each group which were longest under observation. It is impractical to attempt any description of the digestive functions of so many infants. What was accomplished in the weight development of the infants and the increases in the strength of the milk formulæ, and the quantity of each feeding are shown in these charts and are the best evidence I can offer



you of the general effect of the feeding upon the gastric and intestinal functions.

Steady progress in weight development cannot continue over a long period of observation in the presence of disturbed digestion.

#### CONCLUSIONS.

(1) As a result of the study of 82 infants with varying grades of indigestion and malnutrition, one may conclude that many atrophic infants can be educated to take higher percentages of fat than are ordinarily given, with satisfactory results in weight development.

(2) The average rate of gain in atrophic and undeveloped infants who are fed upon whey mixtures with lactose for prolonged periods was 18 ounces per month. When malt sugar is substituted in these mixtures for milk sugar, the rate of gain is increased to  $22\frac{2}{3}$  ounces per month, or an increase of 26 per cent.

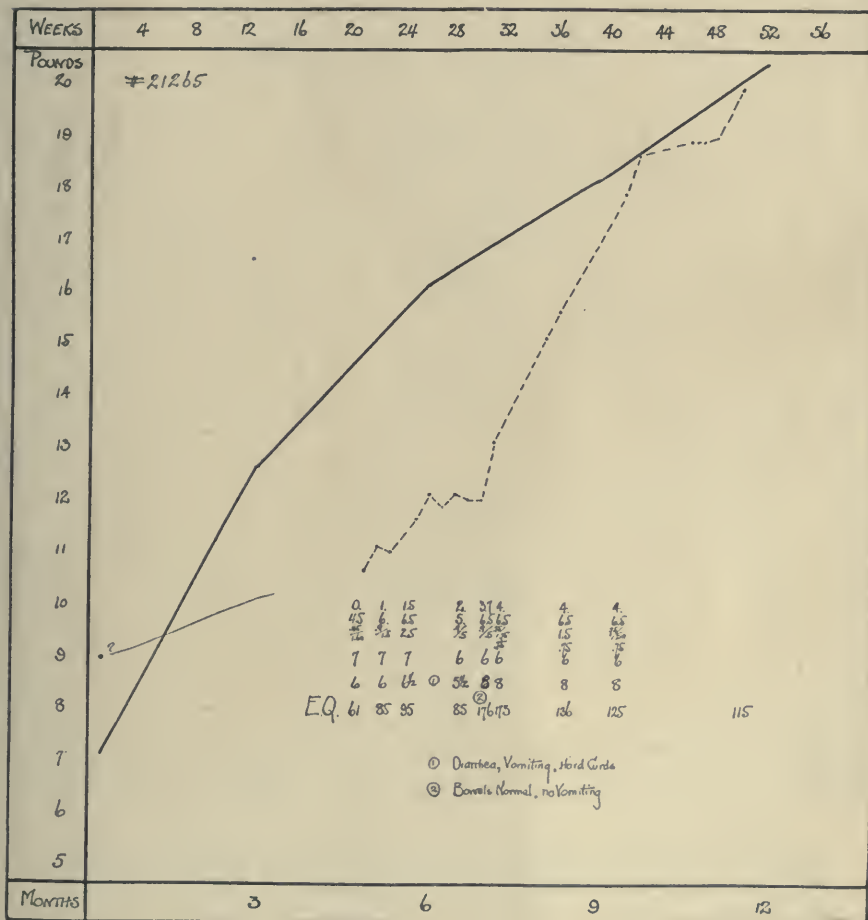
(3) Two series of infants were fed upon plain cream mixtures with barley starch and the excess of sugar was supplied in the form of maltose (maltose and dextri-maltose). In one group the mixtures were not pasteurized; in the other group the food was superheated to a temperature of  $212^{\circ}\text{F.}$  for twenty minutes. The rate of gain in each group was the same; that is,  $21\frac{1}{4}$  ounces per month. Boiling the milk did not in any way lessen its nutritive qualities. The possibility of scorbutus was guarded against after several weeks of feeding by small daily doses of orange juice. Individual cases often did better upon the superheated than upon the raw milk.

(4) With an occasional exception the infants did not make satisfactory gains in weight until the energy quotient was raised to 140 to 160 and sometimes to 175 to 190. Generally speaking, the energy quotient is greatest when the weight development is farthest from that of the average normal infant, as determined by the weight chart.

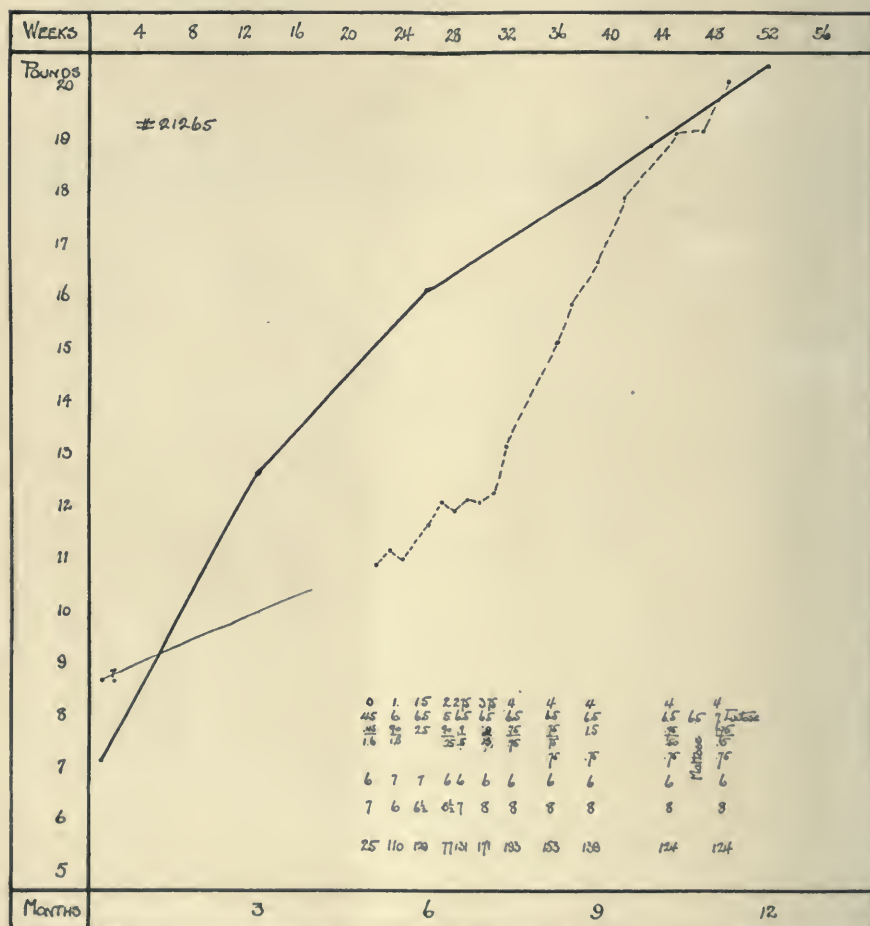
(5) The quantity of food to be given an atrophic infant is only a little less than that which the normal infant of the same age receives, and is often from  $1\frac{1}{2}$  to 2 ounces more than would be given to the normal infant of the same weight.

(6) The detailed study of the weight and feeding charts in a large series of cases shows great variation in the individual requirements and the impracticability of applying general rules of feeding to the atypical and difficult cases.

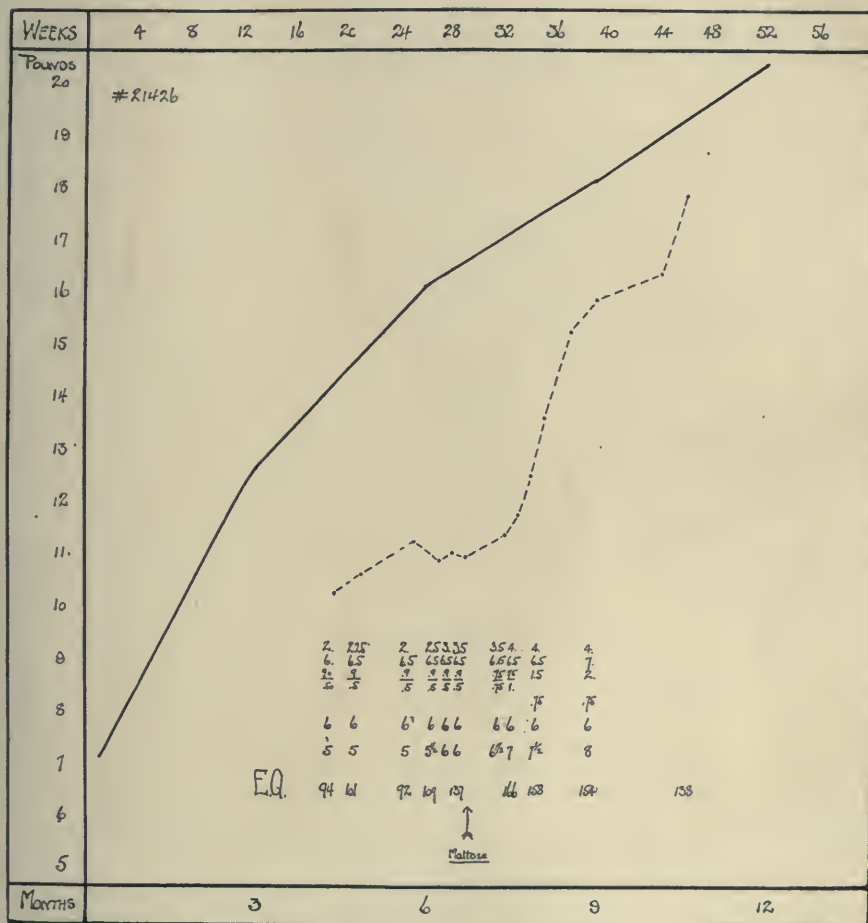
There are here reproduced seven of the twenty-two charts which were shown in illustration of the points emphasized in the paper, with brief notes calling attention to facts which are pertinent to the subjects discussed.



A baby, weighing in the neighborhood of 9 pounds at birth, and 10 pounds and 14 ounces at the twenty-first week. In nine weeks of low fats there was a gain of 1 pound and 6 ounces only. The gain in weight was not marked until the fats were raised to 3.75 per cent. and the energy quotient to 176. On the twenty-fourth week a digestive crisis followed the change from a whey to a high total proteid mixture. On a 4 per cent. fat and a whey mixture with barley starch the gain in weight was rapid and consecutive, amounting to 8 pounds in twenty weeks.

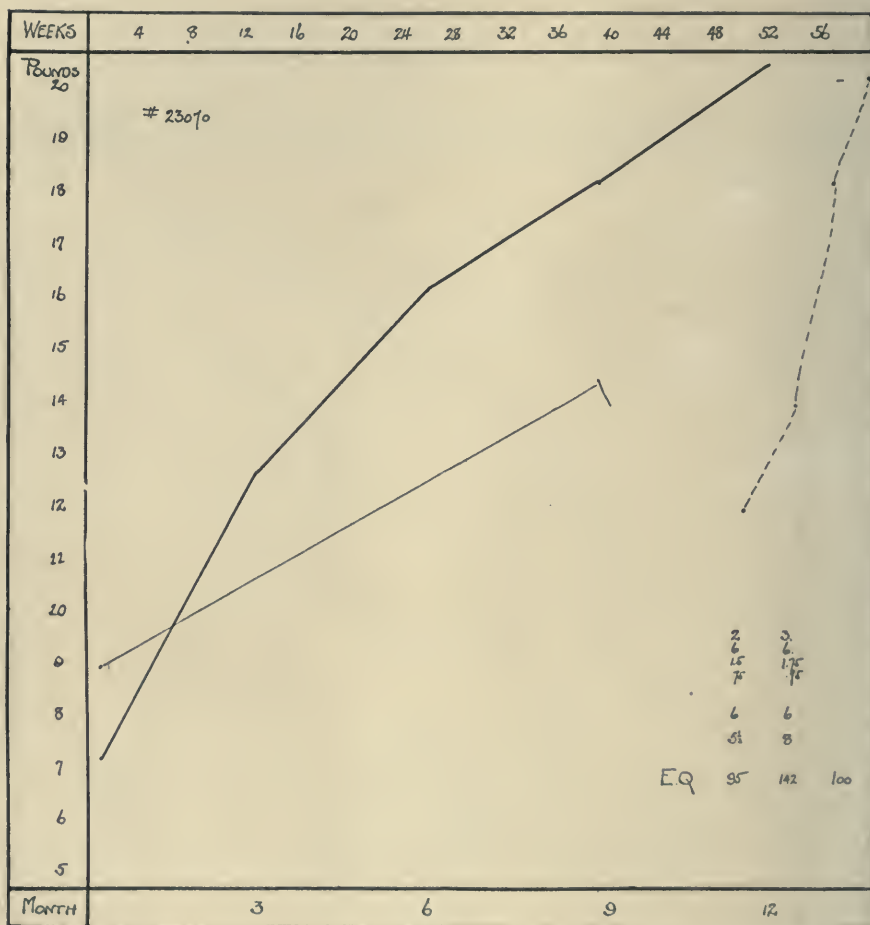


An interesting case of a baby who gained 9 pounds in twenty-seven weeks upon a whey mixture, the casein of which did not exceed .75 per cent., except in the first two weeks, when it made no gain in weight. The gain in weight was not marked until the fats were raised to 3.75 per cent. and the energy quotient to 171 to 193. Note the cessation in the weight curve when for four weeks maltose was substituted for lactose, and the rapid resumption in weight development upon resuming lactose.

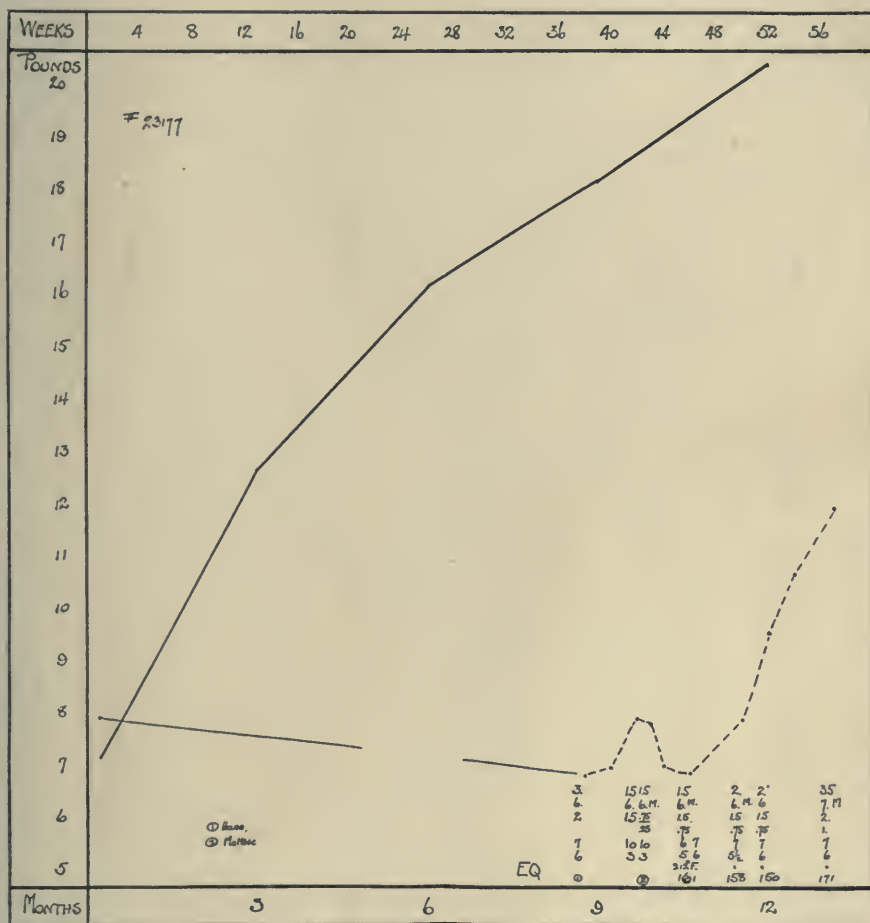


A large infant at birth, said to have weighed 12 pounds, weighed 10 pounds and 6 ounces at nineteen weeks. Note the slow rate of gain until the fat percentage was raised to 3.5, and maltose was substituted for milk sugar. The highest energy quotient was 166. While on maltose, the gain in weight was 6 pounds and 8 ounces in fourteen weeks.

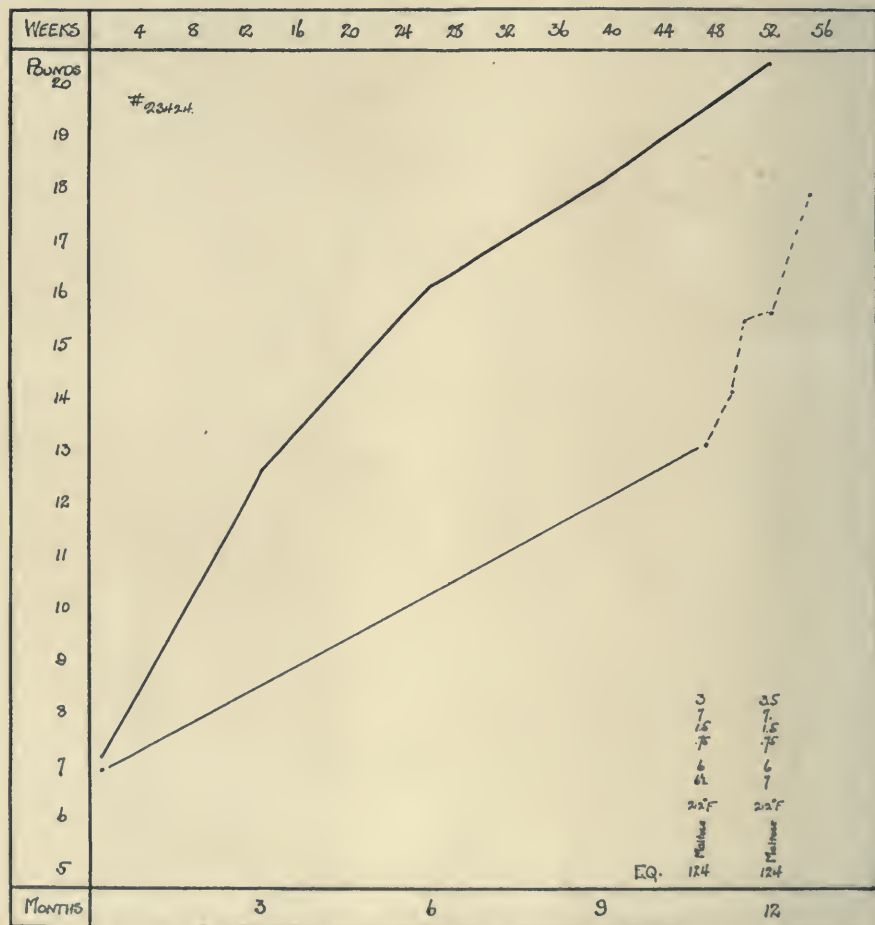




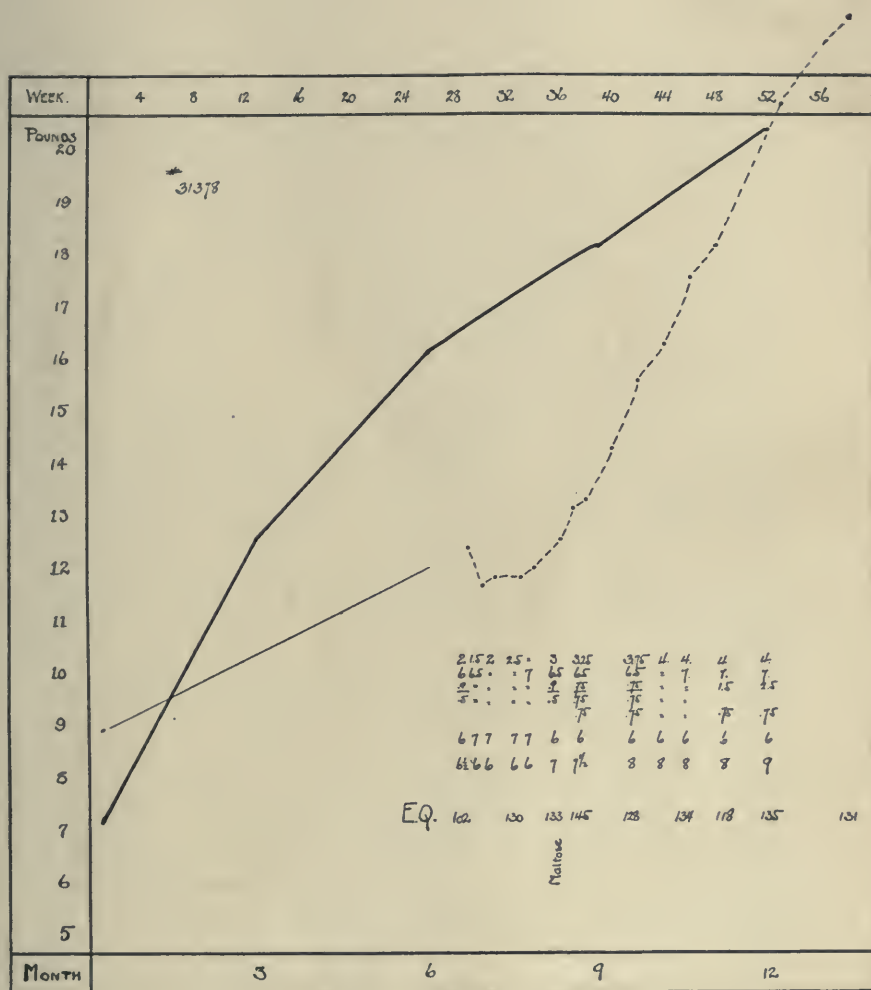
This case represents what I have, for lack of a better name, called "starvation diarrhea." It was a 9-pound baby, who at nine months weighed 14 pounds and 7 ounces. It was referred in August to the Floating Hospital with a diagnosis of infectious diarrhea, and remained there until the middle of September. The baby was again brought to the clinic in November with a history of having been sick all summer with diarrhea and loss of weight. The movements had never become normal. They were three and four, "and often more," a day, green, watery, undigested and containing much mucus. There was no fever. Because of the diarrhea, the local physician had kept the baby for six weeks upon a feeding consisting of 2 ounces of skim milk and 4 ounces of barley water every three hours. This was followed for two weeks by four teaspoonsful of malted milk to 6 ounces of water. When I saw the baby, November 9th, the weight was 12 pounds. The stools were as described. The child appeared to be very hungry, and was at once started upon a malt and barley mixture, as shown in the chart. The stools soon after became normal, and the gain in weight was rapid, amounting to 8 pounds in two and one-half months, a rate which bore striking evidence to the correctness of the diagnosis of starvation as a cause of the diarrhea. One sees many cases of this type in the clinic in the autumn months. The low feeding, which is very properly instituted at the onset of an acute diarrhea in the summer, is often prolonged beyond all reason, and in itself becomes a source of the continued indigestion. If, in such cases, the character of the stools is disregarded and a food of substantial quality given, the hunger is satisfied, the child gains rapidly in weight, and it is only a matter of one or two weeks before the stools become normal in character.



A very marked case of infantile atrophy; an 8-pound baby that weighed 6 pounds and 14 ounces at forty-five weeks. A striking illustration of a baby that gained upon a superheated malt and barley mixture, when a variety of other mixtures, including unheated malt mixtures, had failed. The child gained  $4\frac{1}{2}$  pounds in eleven weeks, and is still under observation, with the high energy quotient of 161 to 171 and the relatively large amount of food at each feeding in proportion to its weight development.



A case showing a very rapid gain in weight upon a superheated malt and barley mixture, 4 pounds and 12 ounces in eight weeks, the energy quotient being 124.



An infant, weighing 9 pounds at birth, and 12 pounds and 6 ounces at twenty-eight weeks. Until the fiftieth week this child was fed upon a whey mixture with barley starch, subsequently upon a total proteid mixture. Note the gain in weight following the use of higher percentages of fats and the substitution of maltose for milk sugar. The highest energy quotient was 145. From the low to the high point the gain in weight was 11 pounds in twenty-five weeks.



# INCLUSION BODIES IN THE BLOOD OF SCARLET FEVER AS A MEANS OF DIFFERENTIAL DIAGNOSIS.\*

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AND

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In the *Centralblatt für Bakteriologie* of November 23, 1911, Professor Döhle, of the Institute of Pathology of Kiel, reported that in 30 cases of scarlet fever blood examined by him he found almost without exception in the polymorphonuclear leukocytes certain inclusion bodies which, to the best of his knowledge, had not been previously described. By various methods of staining these bodies could be readily differentiated from the nuclear substance even when they lay near it, the leukocytes themselves appearing normal. The number of the latter involved varied in different cases, as did the number of bodies in each leukocyte. They could not be found by him after the sixth day. A large number of control cases were examined, and in but three were inclusions found: (1) in a case of pneumonia, which, however, the writer thinks may have been mislabelled; (2) in a case of carcinoma in which the bodies were not typical, and (3) in a second case of carcinoma in an old luetic in which the bodies could not be distinguished from those of scarlet fever. The writer refers to Bernardt's recent findings of inclusions in the cells of lymph nodes and kidneys in scarlet fever, but states that they bear no resemblance to those described by him. This observer worked under the disadvantage of having blood preparations sent from a distant city and being, therefore, unable to control his work by clinical observations.

Dr. Martin Kretschmar, assistant physician in the Children's Clinic of the University of Strassburg, reports in the *Klinische Wochenschrift* on March 11, 1912, that he has been able to con-

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\* From the Research Laboratory of the Department of Health.

firm Dr. Döhle's work, having found the inclusions in all of 30 cases of scarlet fever examined. In 15 cases in which daily examinations were made these bodies disappeared as follows: One on the fifth day, several on the eighth and tenth, several not until the fourteenth or fifteenth, and one not until the twenty-eighth day. In 1 case the bodies were found on the day preceding the rash. Seventy controls were examined, among which were 20 normal cases, 8 measles, 6 diphtheria, 1 of sepsis, 1 of serum sickness, and other acute and chronic infections. In 1 case of pneumonia with cervical abscess the bodies were found in very small numbers, and in 2 cases of diphtheria with streptococcus empyema. In one of these they were found in large numbers. The writer speaks of the possibility of streptococcus infection being the exciting cause of the formation of these bodies, but says that in the one case of general sepsis examined they were not found. He recommends Loeffler's or Manson's stain as being simple and efficient. Neither of these observers give any opinion as to the nature of these bodies, but regard them as being of value from a diagnostic standpoint.

With the purpose of testing out these findings, for the present, purely from a practical standpoint, Dr. Anna W. Williams and myself a short time ago began work in the Research Laboratory of the Department of Health, and have to date studied blood smears from 51 cases of scarlet fever, together with some 25 control cases, with the result that 45 cases of scarlet fever showed inclusion bodies such as Döhle described and 6 failed to do so. Of the negative cases, 1 had been ill for eight days or more, 2 for ten days or more, 1 for twelve days, 1 for fourteen days, and 1 for thirty days. The great majority of the positive cases had been ill for less than a week and most of them for less than four days.

The method of examination was as follows: Two or three blood smears were made from each case, one stained with Manson's stain (borax methyl blue), another with Giemsa's stain over night. The inclusions were found chiefly in polymorphonuclear leukocytes and varied in size and shape from small coccus forms to large irregular masses one-fifth the size of a red blood cell. Bacillary forms were also seen. With Manson's stain the nuclei take on a deep blue color, the cytoplasm very faint blue, the inclusions a tint between these two. With Giemsa, the in-

clusions take on a clear delicate blue identical with that of the plastin; the nuclei, magenta.

With Manson's stain the inclusions stand out more clearly as the cell granules stain but feebly.

In fresh cases of scarlet fever the bodies are found in nearly every polymorphonuclear leukocyte.

In the short time at our disposal we are unable to state for how long in the course of the disease these bodies persist. In one case they were found on the twenty-eighth day. In general, it may be said they are found during the first week at least.

The control cases included 3 normal bloods, 12 cases of measles, which had been ill anywhere from the preëruptive period to a week; 3 cases of diphtheria, with severe urticarial rashes probably due to antitoxin; 1 case of erysipelas in an infant, 1 case of pneumonia in an adult with lues, 1 case of follicular tonsillitis in a child of two years, 3 cases of German measles. Of these control cases, 3 only showed inclusions, namely, the pneumonia case in a luetic woman, the erysipelas in an infant, and 1 complicated measles case. The latter is of special interest. The patient was a child of two weeks with a bronchopneumonia of two weeks' duration, which had complicated measles. At the time the blood smear was taken the temperature had shut up suddenly and the leukocytes had increased to 27,000. On taking the blood specimen to the laboratory, the patient having been seen by neither of us, the typical inclusion bodies were found. Two days later I examined the case and found that in the interim the child had developed a scarlatiniform rash and moderate sore throat, together with a continued high temperature, that it had been visited twice by a diagnostician from the department, who finally decided that the case was not scarlet fever, the rash having faded in a very short time. We are inclined to doubt the correctness of the diagnosis.

With the exception of 3 cases of measles, 3 of scarlet fever, and 1 of German measles the history of which was obtained from the resident physician of the hospital in which they occurred, and 1 case of erysipelas, of which the history was obtained from the patient's private physician, all of the cases were personally examined by one of us and the diagnosis clinically confirmed, but in order to eliminate the personal element the na-

ture of the case from which the blood was taken was not disclosed to the examiner until the microscopic findings had been jotted down. With the exceptions noted not the slightest difficulty was experienced in picking out very rapidly the cases of scarlet fever.

There are several pathologic conditions of frequent occurrence which may be, and often are, confounded with scarlet fever, namely, rarely true measles, frequently German measles, toxic rashes (under which may be included serum rashes, drug rashes, rashes caused by intestinal absorption of various kinds and probably so-called exfoliating dermatitis). Rashes due to general sepsis, and more rarely to follicular tonsillitis and influenza. At the present time we think that we are justified by the results of the work of the two authors quoted and our own in believing that a blood examination in the first week of the disease will serve to differentiate scarlet fever from measles, German measles, and probably toxic eruptions. Whether a similar differentiation may be made in the case of rashes due to sepsis, influenza and tonsillitis must be left to be determined by further study. Finally we are not ready at this time to express an opinion as to the nature of these bodies.

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TREATMENT OF VACCINATION SITE.—J. F. Schamberg and J. A. Kolmer (*Lancet*, November 18, 1911) find that the use of a 4 per cent. alcoholic solution of picric acid upon the vaccinated area forty-eight hours after the insertion of the lymph does not interfere with the success of the vaccination. This treatment lessens the degree of the local inflammatory reaction. The patients are not so apt to exhibit constitutional disturbance. The epithelial covering of the vaccine lesion is hardened and there is a decreased liability of extraneous bacterial infection. This is doubtless due in part to the antiseptic properties of the solution applied. Picric acid is about four times as efficient as phenol as a local antiseptic. The common organisms on the skin are lessened in number by the application of solutions of picric acid.—*Medical Record*.



## THE SURGERY OF RACHITIS.\*

BY HENRY LING TAYLOR, M.D.,

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Rickets is a specific form of infantile malnutrition in which all the tissues suffer. The respiratory and digestive mucous membranes are prone to catarrh, the muscles are soft and flabby, and the nervous system is debilitated. Of most surgical interest, however, is the softening of the bones due to a deficient deposit of lime. In spite of this there is marked proliferation of osteoid tissue in the shafts of the long bones near the epiphysis and under the adjacent periosteum. This leads to expansion of the juxta-epiphyseal regions, which is one of the characteristic signs of the disorder. Ossification is delayed and bones often bend under the stress to which they are subjected; after the active process is arrested the bones become abnormally hard. The deformities and precipitate ossification may lead to dwarfing. Rachitic deformities form a large part of the material presented at orthopedic clinics.

The underlying cause of rickets is imperfectly understood, but it seems to be always connected with errors of diet, and to a deficiency of digestible fat. It occurs in the various classes in the community in proportion to the prevalence of improper feeding of babies. In New York and New Jersey, negroes, Italians and Oriental Jews are the greatest sufferers. It will occur in babies in the country and in well-to-do families under otherwise good hygienic conditions, if babies are persistently kept on a low percentage of fat or on diet unsuited to the age. Many cases are produced by condensed milk, proprietary foods, pasteurized milk, when diluted without the addition of cream or top milk, and by food from the family-table, including tea, coffee, wine and beer. The disorder usually begins in the first or second year and is practically self-limited, as where the child is old enough to take adult food the process is usually arrested. Many conditions have been described as forms of rickets, which should not be in-

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\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Spring Lake, New Jersey, June, 1911.

cluded under that term. Congenital rickets is achondroplasia or fragilitas ossium; acute rickets is scurvy; adolescent rickets is bone softening, probably due to change in the internal secretions at puberty; senile rickets is ostitis deformans or Paget's disease; in all of these the term rickets should be dropped. Marasmus lacks the specific characters of rickets and is probably a different form of malnutrition.

As the medical symptoms of rickets are well known, they are omitted for brevity. Surgically, the most obvious symptoms are the muscular weakness, which should not be mistaken for palsy, and the bony changes. The large relaxed belly favors the persistence of hernias. Early rickets is a common cause of the retardation of the usual baby activities, holding up the head, sitting, standing and walking; dentition is also retarded. In the active stage, the bones are modified in form and size, and bent by the stresses to which they are habitually subjected; they are sometimes fractured, and, if so, unite readily. The cranial sutures are late in uniting, the fontanels are large, and the cranial bones may be soft. New bone is deposited at the frontal bosses, giving the forehead a square appearance; the ribs where they join the cartilages are enlarged, giving rise to the rachitic rosary. The juxta-epiphyseal regions at the wrist, ankles and elsewhere become enlarged, and the joints are massive in appearance. The distended belly causes the borders of the ribs to flare, and this is intensified by atmospheric pressure on the softened ribs during inspiration, causing a depression at the sides of the chest, known as Harrison's groove. If this is extreme, the sternum becomes prominent, causing a pigeon chest or other deformities. Scoliosis of an obstinate nature sometimes occurs, and round-back, due to too much sitting, is very common. This may be marked and is often called rachitic spine; it should be carefully distinguished from tuberculous and other spinal affections. The rachitic spine is always rounded and involves many vertebræ; it is also free from spasm, and more or less flexible. It diminishes or disappears when the child is prone, and increases when the child sits. The tuberculous spine shows at first a sharp projection of a single spinous process; it is associated with local stiffness, spasm and referred pain; it does not disappear in the prone position. Tuberculous bone disease is so rare-

ly found during the florid stage of rickets as to suggest antagonism between the two diseases.

The deformities of the lower limbs are common and are of considerable surgical importance; they develop during the second year, when the child is learning to walk. Curves of the forearm do occur, but much more rarely, and may be caused by creeping, or by being grasped and lifted by the arm. The feet are often flat and inclined to the valgus posture. The tibia may be bowed with the convexity out (bow-legs), with the convexity forward (anterior bow-legs), or with the convexity in (reversed bow-legs). Ordinary bow-legs are always combined with a strong twist of the lower portion of the tibia inward, giving the pigeon-toe posture when the knees point forward. Anterior bow-legs are usually combined with knock-knees; reversed bow-legs are rare. Another rare deformity of the tibia is a sharp backward angulation below the tibial tuberosities, causing the appearance of knee hyperextension. The knee may be forced inward at the expense of the external condyle or upper end of the tibia or both (in-knee or knock-knee). The femora are often bowed outward and forward, in addition to tibial bow-legs, causing out-knee and a total bow-leg of the entire limb. A sharp bowing of the femur in its upper part causes a diminution of the angle of the neck (coxa vara), which may also be locally affected. This often gives a waddling gait, very much like that of bilateral congenital hip dislocation. Several of these deformities may co-exist in the same patient.

Records may be easily kept by measurements and tracings, which may be supplemented by photographs and skiagrams.

The medical treatment should be largely dietetic, and should, for infants, consist of fresh milk or milk mixtures suitable to the child's age and digestive powers, with the proper proportion of fats, and the elimination of tea, coffee and other unsuitable foods. Cereals and broths will frequently need to be cut down and replaced by milk. After infancy, milk should be supplemented by food suitable to age. Digestible fat in the form of olive oil, or cod liver oil, is always beneficial. As the lime shortage is due to a defect in assimilation and not to an under supply, the administration of soluble lime is of little avail. Neither is there demonstrable advantage in phosphorus, provided oil is given. In a word, drug treatment seems to be superfluous. The



surgical management should consist in the mild cases in restricting sitting, standing and walking, and in hygienic and tonic treatment. It is a mistake to urge these children to walk. Many of the mild cases of bow-legs and some of the other deformities in young children improve or disappear. Indeed, very mild degrees of knock-knees are common in children who present no signs of rickets, and are probably due to static conditions. In the moderate cases of bow-legs and knock-knees, plaster of Paris splints or braces may be used to correct the deformity if the bones are still yielding, and if good co-operation can be secured, otherwise they are useless. Massage and manipulation are of only moderate benefit, except in special cases. In severe cases of bow-legs, knock-knees and anterior curves, a corrective operation should be performed. The bones may be broken at the point of election by the hands over a block (manual osteoclasis), or by a machine (instrumental osteoclasis); or the bone may be divided by an osteotome pushed through the skin (subcutaneous osteotomy), or through an open cut (open osteotomy). In nearly all cases a simple transverse division of bone (linear osteotomy) is sufficient, though a wedge may be removed in special cases. After a partial section, the bone is usually broken by hand, the deformity slightly overcorrected and the leg padded with cotton and put up in a plaster splint, which may be left on six or eight weeks and reapplied, if necessary. In unstable cases, braces should be worn for some time. Manual osteoclasis over the block is usually easy in bow-legs not over three, where it is not necessary to break the bone very near a joint, and gives excellent results. For older cases, up to seven or eight, instrumental osteoclasis, with a good machine, like Grattan's, is simpler than osteotomy and equally effective. In the older cases, and in adults, osteotomy is the better operation. The writer has never seen delayed union after an osteotomy or osteoclasis, and investigation of the records at the Hospital for the Ruptured and Crippled for ten years have shown only a couple of cases of delayed union after cuneiform osteotomy, and none after linear osteotomy.

In a recent case in a child of two years and four months with bow-legs, the legs were easily broken without an anesthetic and without much suffering, after remaining two weeks in plaster of paris. A good correction was made and a good result was obtained. In several other cases the softening was inappreciable after three or four weeks. Usually the plaster should remain



three to six weeks and the correction may be made at several sittings. If combined with recumbency and elevation of the legs, the results should be more certain. In the hope that this method, advocated by Anzoletti, of Milan, may enable the general and special worker to correct many of the younger cases without anesthesia and without hospital treatment, the method is worthy of further trial.

In bow-legs the bone should be divided at the point that will make the best correction; this is sometimes at the upper third, sometimes at the lower third, and sometimes in the middle, according to the type of the curve. On account of the inward twist of the tibia the lower fragment should be strongly rotated out and held in this posture by the splint. No attention is paid to the fibula. In anterior curves of the tibia the bone is broken sideways, and afterwards the posterior angle thoroughly opened up. This will usually result in pulling up the heel, for which the heel cord should be divided. For knock-knees, it is possible to break the bone near the joint with the osteoclast, but this requires considerable practice. Osteotomy will usually give better results in the hands of the practitioner. The femur should be divided a finger's breadth above the external condyle from the outer side (McCormac's operation). This has the advantage over osteotomy from the inner side (Macewen's), that the fracture is made against the deformity, and there is less tearing of the periosteum. Blanchard, of Chicago, has pointed out that many knock-knees are best corrected below the tibial tuberosities, and the writer's experience confirms his observations. Knock-knees require after operative correction, a splint reaching from the toes to the lumbar spine, and the splinting should remain longer than after bow-legs. Bowed femora are concealed by the clothing, and as, unless excessive, they do not seriously interfere with function, they seldom come to operation.

Correction of leg deformities often lengthens the legs by an inch or more. In 2 recent cases of bow-legs in children of two years, the legs were an inch and a quarter longer after correction. The tendency of the thoracic deformities and other rachitic stigmata is toward gradual effacement. They do not, as a rule, interfere with the health, and do not require special treatment. The rachitic spine may require recumbency for some months, as sitting aggravates the trouble. To insure recumbency, it may be

necessary to strap the child to a pillow, padded board or frame while the rachitic process is being treated.

The dietetic and hygienic treatment of rickets is definite and simple, and the surgical measures are safe and successful. Bones may be adjusted even in young children with as much facility as tendons or soft parts, and with little shock or reaction. Even in adults, old rachitic deformities of the limbs may be relieved by operation, but no one should be permitted to reach adult life in a crippled condition when these deformities can be so readily prevented or corrected in childhood.

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ANAPHYLAXIS AND COW'S MILK.—Finizio (*La Ped.*, September, 1911) records 4 cases of marked idiosyncrasy to cow's milk, 2 of the cases occurring in one family and 3 being congenital. The amount of milk necessary to cause symptoms of anaphylaxis was very small, in each case varying from 20 grams to 120 grams. The symptoms set in rapidly, rarely later than three hours after ingestion, beginning usually with vomiting, followed by frequent liquid, green stools and some rectal tenesmus; occasionally the stools were bloody. In addition certain spasmophilic symptoms set in (tetany, convulsions), and these might persist for long periods after the acute gastrointestinal symptoms had disappeared. The temperature was raised in 3 out of 4 cases. The acute symptoms disappeared with considerable rapidity—that is, the collapse dyspnea, vomiting and diarrhea—but the fever and spasmophilias persisted for some time. Examination of the blood serum of 2 of the cases showed distinct precipitin reaction with cow's milk, and in the fourth case there was a diminution in the complemental power of the serum, which tends to prove the existence of a condition of anaphylaxis in these cases. In one of these cases there was a history of maternal tuberculosis; possibly this may have some bearing on the predisposition to anaphylaxis. On the theory that the heterogeneous protein introduced was the cause of the symptoms, the milk was predigested, but without any obvious good effects. On the other hand, milk serum (given as a kind of vaccine) seemed to have a beneficial effect. At present we know only a little about anaphylaxis, but if these cases of intolerance to cow's milk prove to be examples, the study of them may, as the author believes, throw a little further light on this obscure subject.—*British Medical Journal.*

## SOME NEWER ASPECTS OF THE PROBLEM OF INFANT HYGIENE.\*

BY ALEXANDER McALLISTER, M.D.,

Camden, N. J.

One of the most promising details of the present widespread movement for the betterment of mankind is that which has to do with hygiene in infancy. The social side of the question is one not so well known by the lay public, so I shall consider that first.

The importance of the subject of sexual hygiene in general, and that portion of it relative to venereal diseases in particular, daily is assuming larger proportions in the minds of the laity. The well-known fact that death among the illegitimate outnumbers about two to one of those among the legitimate can readily be explained on grounds that are apparent. It is not so much the fact *per se* that the child is illegitimate that determines its susceptibility to disease as it is that in the majority of cases the child's constitution has been undermined by venereal disease, that, as a rule, it is unwelcome, that it often is surrounded by squalor, misery and poverty, and that almost invariably the mothers or caretakers are ignorant as to the proper care of children. The recent discoveries in the realm of syphilis and the furore that its treatment by arsenobenzol has aroused attest to the interest, both professional and lay, in the detection and elimination of these grave social diseases. The dangers with which they are associated are daily more apparent to the more intelligent part of the lay public. If only for the sake of future generations the risk of their inception should be avoided. Of such importance has this become that legislators have been considering the necessity of demanding clean bills of health, especially of sexual health, from candidates for marriage.

The value of the Cr  d   method of the prevention of ophthalmia neonatorum as the means of preserving the eyesight of countless thousands of otherwise helpless individuals could be, and in recent years to a limited extent has been, enhanced by a proper appreciation on the part of prospective parents of the subject of sexual hygiene.

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\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Hotel New Monmouth, Spring Lake, New Jersey, June, 1911.



The general ignorance of parents as to the subject of the care of children is one of the most fruitful sources of infant mortality. Even the otherwise intelligent classes seem at times to be most woefully lacking in knowledge of this most important special subject. No longer can the so-called mother's instinct suffice to displace careful, scientific reason and training in this difficult department of knowledge. All the mother's instinct in the world cannot stand guard against exposure to a single diphtheria bacillus. It remained for the laboratory to furnish information as to the portals of entry of epidemic cerebro-spinal meningitis and of acute poliomyelitis, and to furnish precautions as to how to avoid the diseases, and, if possible, how to cure them. An up-to-date mother would be well-versed as to the seriousness of an epidemic of anterior poliomyelitis and would know how to carry out suggestions of the physician as to its possible prevention. The public only gradually has awakened to the grave dangers attending the use of disease-infected milk. Still, much along the lines of popular education in this direction seems to have been accomplished during the last decade. The so-called "mothers' meetings" at the public schools have been the means of promoting interest in the mental and physical condition of children of school age. Why not institute similar meetings of prospective mothers, or mothers with very young children, which could be addressed by competent physicians on the subject of care of infants? Such meetings would be the means of awakening interest in the closely related subject of sexual hygiene—a subject which in this country has all but been eliminated from its proper place in the public school curriculum. The conversation of lads of grammar school grade will amply prove that they need authentic information on the "mystery of mysteries" to take the place of what they pick up for themselves from untrue and unchaste sources.

Not only should the parent be instructed in sexual hygiene, but general and personal hygiene as well. The example set by the parent is still a potent factor in the rearing and training of children. The avoidance of intemperance in the use of alcoholic and other beverages, and above all the avoidance of exposure to the action of the tubercle bacillus should be practiced by parents and taught to them and to their children.

The sum and substance of the subject of the prevention of



infant mortality and the preservation of infant health is that it is a part of the general problem of the prevention of poverty and ignorance among the masses—a question indeed not so much medical as sociological. The death-rate among infants in a population is in inverse proportion to the intelligence of that population.

Here a word as to “race-suicide.” Professor Scott Nearing, of the University of Pennsylvania (*Popular Science Monthly*, January, 1911, Vol. XXVIII., No. 1), has traced it to causes more subtle and potent than is commonly supposed. He assigns to the question of the food supply an important place in the explanation of the problem, and states that when the laborer was confronted with the problem of having many children and retaining his social and financial status, or having a few children, and becoming richer and rising above his station, he chose the latter alternative. Thus, asserts Nearing, the nation with a rapidly diminishing death-rate was saved from over-population and the general lot of the children who were born was better. Whatever we may think of Nearing’s theory, we can but agree that it is better for a family to have two or three children, with a reasonable hope of raising them to maturity, with the advantages of an education, than to bring into the world a brood that they are unable to provide for, and that may add to the sum of ignorance, poverty, misery and disease.

We will now pass to a consideration of the general hygienic treatment of the new-born infant and of infants in general.

It is surprising how frequently physicians neglect the simple rule that after birth babies should be laid on their right side. The closure of the foramen ovale is facilitated by this procedure.

After the cutting and dressing of the cord the child should be turned over to the tender care of the nurse, who should remove the vernix caseosa properly with olive oil or with purified white vaselin, and sponge the child with warm water in a well-warmed and protected part of the room.

Immediately after birth the baby should be weighed. Proper charts of the weight of the baby during the succeeding months should be conscientiously kept to date. Losses of weight should be ascribed to their proper causes and errors in nursing or feeding remedied.

After the cord has separated, the child should be bathed in a

small tub once a day. The water should be soft and clean, its temperature as indicated by a bath-thermometer should for the first few months be 98°-100° F. After this it should gradually be reduced. Castile soap for purposes of cleansing should be employed. The infant after bathing should be thoroughly dried with a soft cloth (an old diaper will suffice) and powdered with fine talc or cornstarch.

The use of the belly-band persists in spite of the warning of authorities as to its uselessness or even harmfulness. At all events, if used, it should not bind tightly, and should be at least six inches wide. With regard to the infant's clothing it should be of sufficient weight to insure warmth, and yet not be so heavy as to cause discomfort to the child. Practically all the weight should be supported from the shoulders. There is a general tendency to overclothe rather than to underclothe the infant. Isolated portions of the trunk and extremities should not be exposed.

For the first few days of life conjunctival sacs should be carefully washed with boric acid solution—gr. xv to the ounce. At no time should the eyes of infants be exposed to bright lights. The mouth should be washed with plain boiled water. The prepuce of male infants should be carefully examined, and if abnormally long, tight, or if it contracts adhesions the child should be circumcised. Sebaceous material should not be allowed to collect beneath the foreskin, and the internal surface of the same should be kept well greased with vaselin.

The skin of the child must be carefully watched and any source of irritation eliminated.

Three to six months after birth, or a longer period if the child is delicate, it should be vaccinated, and the resulting vaccinia should be properly observed by the physician, and, if necessary, treated.

The hours of sleep of a newly-born infant, and as the child grows, if it has been properly trained, will readily regulate themselves. By the time the child is a year old it needs fifteen or sixteen hours of sleep a day; older children still less. The child should sleep in a bassinet or crib during the first few months of life, and later in a crib. On no account should it be permitted to occupy the same bed as its mother. The danger of overlying and that of too frequent nursing is thus avoided. At night the

child should be put to its place of rest, and the attendant should leave the room. On no account should the child be rocked or sung to sleep. The child is not to be disturbed at night except at regular hours, when it should be nursed. It should not be taken from its crib just because it lies awake or cries a little.

After the first few weeks of life the baby begins to feel the need of movement, and begins to move its arms and legs rather vigorously. At the age of two weeks it should be systematically carried about the room two or three times a day. For the first few weeks it should be carried on a pillow. Later the pillow may be dispensed with. At the age of one month to six weeks it should be taken for a few minutes into the open air (properly protected, of course). The outing should be regular, providing the weather permits. Ill-advised attempts at hardening should be frowned down, as should be also the tendency on the part of some mothers to pamper. At the age of three or four months a perambulator should be used for the purpose of the child's airing. As the child grows it may be allowed to kick and play on a blanket or mattress in a suitable part of the room. The floor, protected by such a blanket, may be used if it is free from draughts.

Gradually the child learns to creep, and at the age of nine to sixteen months to walk. The child should be allowed to take its time for the accomplishment of locomotion. In this way not only is the danger of bow-legs in a rachitic child lessened, but many knocks and falls are avoided.

Firmness combined with gentleness on the part of parents can do much to insure the cultivation on the part of the child of cleanly and healthful habits. One of the most important of these is control of the bowels. It is wonderful what an intelligent mother can do with a well-trained child as far as this is concerned. The training should begin early, and often saves much discomfort on the part of both parent and child. The child, even as early as three months of age, should, for the purpose of having it empty its bowels, be placed on a small chamber, or on a proper low baby's chair made for the purpose. Regular times for movements should early be encouraged. It is best to place a baby on the chair a short time after feeding.

During the period of dentition, precautions as to the general health of the child should be very great because of the digestive and nervous disturbances that occur at this time. If the gums



are swollen and tense they may have to be lanced. Much may be done to relieve pain from this source by allowing the child to suck small pieces of ice.

The baby should be protected from traumata to its nervous system by physical and mental shocks. Bright lights, noise, rough handling, and tickling should all lie outside the sphere of the child's mind. Incalculable harm has often been done unintentionally in this way by admiring but irresponsible individuals.

The nurse of a young infant should be a pleasant and agreeable person, in good physical health, free from syphilitic taint, and should possess a natural love for children and her work. In its airings the child should be brought in frequent contact with other cared-for children of the same age, as social habits are by this means early inculcated.

The baby in its early efforts to talk should never be encouraged in the use of so-called "baby-talk." If possible, the English it hears should be the purest, and defects of articulation and even of diction should early be corrected.

The baby's room should be the sunniest and best ventilated in the house. Free ventilation without draughts is very necessary. The air should be at a comfortable temperature. All plumbing should be absent, or, if present, should be frequently examined to make sure that there is no contamination of the air of the room with sewer-gas. All furniture should be as simple as possible.

In the above, I have endeavored to collect some of the principal points that must be taught to parents in order to insure the health of their posterity. Exceedingly simple, if properly understood, they are nevertheless frequently neglected, and not easy to enforce. Many of the directions can readily be followed by parents with very moderate means and, indeed, serve to economize their time and nervous energy. Means of teaching them to the poorer classes have already been suggested. Here especially is the battle to be fought against ignorance and misunderstanding.

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TREATMENT OF DIPHTHERIA CARRIERS.—H. Page (*New York Medical Journal*, December 23, 1911) reports the case of a child in which, following an attack of diphtheria, the persistence of Klebs-Löffler bacilli in the throat was treated successfully by swabbing the latter with pure cultures of *staphylococcus pyogenes aureus*.—*Medical Record*.



## APPENDICITIS IN CHILDHOOD.\*

BY EMERY MARVEL, M.D.,

Atlantic City, N. J.

Appendicitis is a more common disease than is accepted by pediatricists. Our usual lecture-room teaching, text-book arguments and current journal contributions fail to emphasize the importance of the subject that its prevalence and seriousness deserve. A reference to the surgical statistics of the average general hospital is enlightening: From 35 to 40 per cent. of the cases of appendicitis treated are under fifteen years of age. I am impressed by reviewing the records of my private patients operated for appendicitis during the past five years to find that 46 per cent. were children. These records do not take into account that nearly every city has special provisions made for the care of the indigent children, hence a good portion of the children would not be included in these statistics. Reference to the popular text-books find of the space allotted to the discussion of the diseases of the digestive organs that only 3 per cent. is given to the subject of appendicitis. The lecture-room teaching is probably a little more liberal, but current journal contributions are less generous.

Many cases recognized and operated upon in the first weeks of life are on record with recovery; records also show deaths with autopsy findings and reveal the story—"it might have been." Antemortem removal of a gangrenous appendix by Dixon from an infant before term (twenty-four days premature in the eighth month) secured a recovery and saved the child. Gloninger did likewise in a child at eleven days.

These facts illustrate the axiom "a living child without an appendix is to be preferred to a dead child with its appendix." The recognition of the trouble and the prompt action solves the difference. To recognize a morbid appendix needs to accept not only the possibility of its existence, but *probability*.

The clarification of many vague abdominal troubles would be more easily reached by adhering to the aphorism: "Consider all cases of abdominal distress to be appendicitis till proven other-

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\* Read at the Second Annual Meeting of the New Jersey State Pediatric Society, Hotel New Monmouth, Spring Lake, New Jersey, June, 1911.

wise." It might be well to add also all cases of digestive disturbance. Two sad cases have recently been noted by us. One a boy of five, the pride of the family. Three days observation and treatment for first indigestion, later obstruction of the bowel with death. Autopsy showed the gangrenous appendix with general peritonitis. The second child of this family, aged six months, came under our observation last August—had been ailing a few weeks. Diagnosis, chronic appendicitis; enlarged appendix containing fecal concretion removed; recovery complete. Another case was in a physician's family, whose five-year-old child was taken ill on Tuesday, treated until Friday, operated when general peritonitis had followed a perforated appendix; died. I saw the younger child of this physician in August last, diagnosed acute appendicitis at the first visit at 2 P.M., operated at 9 P.M., removing a suppurating appendix. The little one left my hospital for Parksburg, Va., on the sixth day after operation. It is difficult to estimate the grief exhibited by the parents of these children as they contrasted the loss of the little one with the saving of their other child. Is there any wonder that they feel as they did that their loss might have been saved by early recognition and its applied remedy by the physician in charge?

Harry Deaver, in a comprehensive and masterful presentation of this subject at the 1910 American Medical Association meeting, invited attention in a convincing manner to the frequency of this disease in childhood, and bespeaks the seriousness of its process, begs for its recognition and commends means for its relief.

We need not go far to gain a general explanation for the predisposition childhood offers. The histologic, anatomic and physiologic conditions invite, and the habits incite its action. The solitary glands and follicles of Lieberkuhn furnish abundant lymphoid structure, more susceptible to morbid processes in the development of childhood than in maturity. A proportionate size of the appendix to the colon in child is greater than in adult. Its position with the colon high and the appendix hanging favors more its becoming a receptacle for the contents of the colon. The physiologic form of digestion predisposes food particles locating favorably to induce inflammatory process. Violence of action, the infant in crying, the child in rope jumping and other sudden

impulsive movements, serve as additional injury or force the contents of the colon to inhabit the appendix lumen.

Sudden inflammation or insidious protracted irritation manifest the trouble. The recognition in some respects is less difficult than in adult life; in other respects more so. The infant deprives the examiner of some of the usual positive evidences; it also, on account of its infancy, relieves him of some evidences confusing in later life. Localization of tenderness in a distressed baby may be quite difficult, but you need not consider ectopic rupture, renal calculi or obstruction from malignancy. The acute attack exhibits distress, restlessness, vomiting, crying and abdominal soreness. So do acute digestive disturbances. But in the sleeping or restful moments, slight, and then greater, pressure over the abdominal surface comparing the respective positions forms the crucial test. The cardinal symptom is local tenderness over the appendix. This should be attained before extensive peritonitis or local pus formation outside of the appendix has become a sequence. General peritonitis confuses differentiation; local pus formation must be determined upon by circumscribed findings. Rectal examination aids the determination. If conservation of life, comfort and the convenience is to be attained the diagnosis of appendicitis before the serious sequential troubles are added is essential. There is as much difference between the seriousness of appendicitis when circumscribed within the appendix, and when a general septic peritonitis resulting from perforation or a gangrenous appendix has taken place, as there is between the fire of a kitchen range and a spreading conflagration through all parts of the house. One is under control, and the other promises full destruction. The difference lies between early or late recognition.

Chronic appendicitis is insidious and protracted in its course. It is less frequently suspected, but claims a greater number of victims. The language by which it speaks is a jargon and most times erroneously translated. Too often it is interpreted as colic, worms, enteritis, colitis, nervousness, indigestion—classified by different appendages other than vermiform. Indefinite and irregular bellyache; indifferent or irregular appetite; periodic abdominal distention, with or without complaint of soreness; bad nutrition; uncheerful disposition; the delicate child with constipation or possible mucous stools signalizes its probability. When



any, or many, of these symptoms are present and the physical examination discloses greater tenderness over the area of the appendix more than the corresponding side, involvement of the appendix can be conjectured. Should this tenderness be very marked, its involvement can be reasonably assured. This kind of appendix involvement can persist without claiming the life. It does not exist without handicapping its victim and jeopardizing the life. The violent acute attacks are too often the outcome of the chronic insidious preparation. The dreaded endocarditis, nephritis and other local organic involvements are the remote penalties paid for a prolonged drainage of an infected appendix into the alimentary and lymphoid circulation. Chronic appendicitis has a language by which it signalizes its presence, and threatens danger. Too seldom are its signals noticed, or recognized. The symptoms of appendicitis may differ from the same disease in adult life, but its treatment does not.

Early extirpation is a safe procedure. Children endure surgical operation with less danger than adults. To procrastinate by measures for palliation is to invite additional danger without lessening the corresponding risk. Tiding over an attack of acute appendicitis, if it should succeed, is usually taking a policy to secure later catastrophe. Deferred extirpation of the chronic irritating appendix in the hope of cure or permanent benefits gains disappointment and procrastination is penalized by the production of a weak neurotic, dyspeptic, dependent or by grief consequent upon the sudden fatal termination.

#### CONCLUSION.

(1) Appendicitis is a more common disease of childhood than is generally understood.

(2) Its frequency, baneful consequences, and comparative certainty of correction, when recognized early, appeals for a closer scrutiny to determine its existence.

(3) The seriousness of the disease manifests itself in the impairment of health, and the jeopardizing life commands its eradication.

(4) The only sure eradication is early extirpation of the appendix.

1801 *Pacific Avenue.*



## A COOL BED FOR INFANTS.\*

BY ALFRED F. HESS, M.D.,  
New York.

It is a generally accepted theory that heat plays a considerable rôle in the problem of infant mortality, although its exact importance has not, at this time, been definitely established. As



Cool bed for infants.

has been suggested in another connection, it would be well if the babies' wards could be thoroughly cooled in summer, but although this is an ideal which may come to pass, it is, as far as I am aware, merely a dream of the future. Realizing this necessity, it seemed worth while to attempt to devise a bed in which the infant could be protected against the excessive heat of our summer season. Last year during July and August I made use

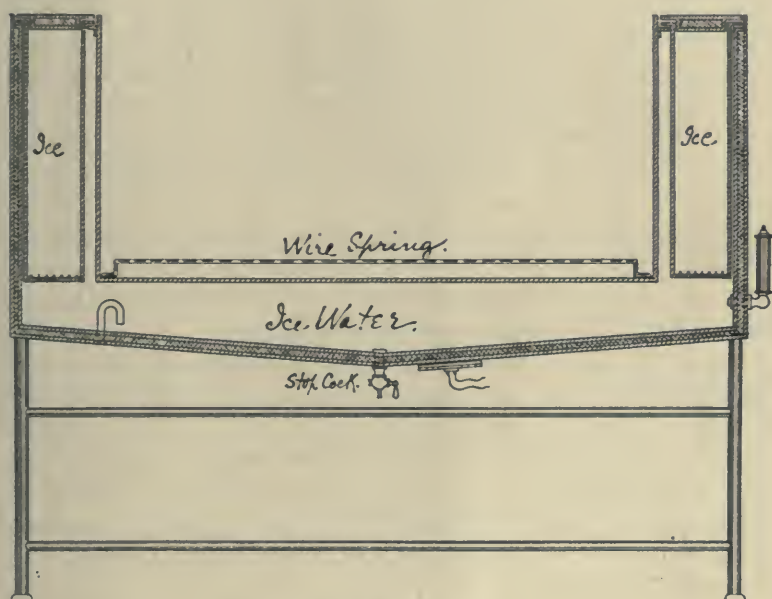
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\* From the Research Laboratory, Department of Health, New York City.

of a bed constructed for this purpose, and, finding it of value in the infant's ward, it seemed as if it might be worth while to draw attention to its possibilities.

A photograph and section of this bed, which, for convenience, may be termed an infant's "cool bed,"\* gives a clearer idea of its construction than mere description.

Ice is placed at both ends of the bed, in reservoirs that can be lifted out to be filled, and the melted ice flows into a tank situated



Section of cool bed for infants.

as shown in the diagram. The reservoirs for the ice and for the water are protected against heat by insulation with asbestos upon the outer sides, but the surface toward the baby is merely of metal. As the photograph shows, the sides of the bed are the same as those of the ordinary crib, and allow of a free play of air. The wire spring, upon which the blanket is placed, is raised sufficiently above the water tank to permit the air to circulate beneath it.

During the summer this bed was used for any case of enteritis accompanied by a high temperature. Comparative tests showed

\* The cool bed is manufactured by the Bramhall-Deane Co., New York City

that a thermometer placed under the covers registered  $7^{\circ}$  to  $10^{\circ}$  lower than one in the ordinary crib. In other words, when the ordinary bed registered  $85^{\circ}$  to  $87^{\circ}$ , the temperature in the cool bed was  $75^{\circ}$  to  $80^{\circ}$ . No disadvantages were found, other than the necessity of filling the ice-tanks morning and evening. If the bed grew too cool, either the ice water was allowed to run off, by means of the stop-cock, or one or both of the reservoirs of ice was lifted out.

It will be noted that the diagram shows a small electric heater and a thermometer. This was originally not part of the "cool bed," but was a variation made use of this winter, in order to turn the bed to service in the treatment of babies with subnormal temperature. For this purpose warm water was put into the reservoirs, the electric heater was then connected to the ordinary electric light socket, and the bed was kept at a temperature of about  $95^{\circ}$ .

We have no intention of suggesting that wards should be entirely furnished with beds of this description, as we realize that this would be hardly practicable. However, where wards cannot be made cool it would seem worth while in the summer time to have one or more beds of this description for the treatment of infants who are admitted to the hospital in a prostrated condition. And it would seem that this bed could also be made use of in some homes during the summer months. People would not need to purchase a "cool bed," they might rent one, just as they now can rent an incubator for the care of the premature infant.

*154 West 72d Street.*

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SPORADIC CRETINISM.—B. C. Stevens (*Lancet*, June 18, 1910) records the occurrence of sporadic cretinism in 4 children in one family, the oldest being nearly thirteen years of age. The remaining child, ten months old, had not yet shown signs of the condition. Those affected had all grown well until three years old, when growth was retarded and the thyroid enlargement began to appear. The thyroid gland was generally enlarged in all, though one lobe was more prominent in each. The family history was absolutely negative as regards parental illness and previous cases of cretinism.—*American Journal of Obstetrics.*

# AN EPIDEMIC OF THROAT INFECTION WITH GLANDULAR ENLARGEMENT

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BY FRANK VAN DER BOGERT, M.D.,  
Schenectady, N. Y.

The interest aroused by the epidemic of septic sore throat occurring in Massachusetts during 1911, and the recent apparently similar epidemic now prevalent in Baltimore, leads me to report a number of apparently similar cases which have occurred in Schenectady during the past winter.

Sixty-two cases have been investigated, several of them occurring in my own practice. This number, however, gives no idea of the actual number of cases existing in the city, since I was unable to obtain complete reports from many of which I had knowledge, and a large number of the physicians were not communicated with. Furthermore, many cases have occurred since the investigation was made.

Twenty-six of the patients were between one and five years of age, 13 under one year, and only 6 of the series were over fifteen.

Three of the cases should probably be eliminated from the series, 1 being an affection of the inguinal glands, and 2 others apparent ordinary quinsy.

The condition of the throat was noted as congested, sore, inflamed or red in 33, tonsils enlarged in 12, membrane or streaking in 4, follicular tonsillitis in 5, severe tonsillitis in 1, and simply as tonsillitis in 2. The throat was negative in 10, and its condition noted in 8.

The glands enlarged were cervical in 28, submaxillary in 18, submastoid in 10, those of the parotid region in 9, and sublingual in 1, and in 1 the gland was not noted. Eight were specified as anterior cervical, 4 as posterior cervical, and 2 as left cervical.

As to the complications and sequellæ, there were none noted in 30 of the cases. Five of the glands suppurated, 1 patient, an adult, showed erysipelas of the face, 2 had earache, and 4 others developed otitis. There was pain in the joints or rheumatism in 3; 4 developed nephritis, 1 pneumonia, and 4 were complicated by bronchitis; in 5 there was no report as to complications.

The most interesting question, in view of the larger epidemics, was the source of the milk supply. One baby was on the breast, 1 patient on certified milk, and the remaining 60 were supplied by 34 different distributors. The milk supply of 8 of the cases was not determined, which means that 52 were supplied by 34



distributors. An effort was made to trace their supply to the producer, but this was unsatisfactory. It was possible, however, to trace the supply at least part way in the cases of 13 of the distributors, and only in one or two instances was it found that any two men were supplied by a single producer or middleman. This, together with the fact that the disease was so widely distributed over the city, at least 1 case occurring in each of the thirteen wards, and not more than 8 in any one ward, leads to the belief that the milk supply may be disregarded as a causative factor.

A search of the records of the Board of Health from October 1, 1911, to February 1, 1912, the period covered by this report, shows that no deaths can be attributed to the disease.

### III Union Street.

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THE EUCALYPTUS TREATMENT OF SCARLATINA.—Koerber (*Munch. Med. Woch.*, March 12, 1912) has been testing Milne's treatment at the Hamburg-Eppendorf Hospital. The English pediatricist had been using eucalyptus in scarlatina for a quarter century. The author divided his material so that a certain number of patients were treated by Milne's method, while the remainder were managed in the usual way. In addition to inunctions with eucalyptus oil, Milne recommends swabbing the throat every two hours with 10 per cent. carbolic acid. The treatment is intended incidentally to prevent the spread of the disease to others, including return cases. This point was especially investigated and apparently with an unfavorable result, as the frequency of return cases was not lessened, but, in fact, lightly increased. In regard to mortality, this under the customary treatment was but 2.56 per cent., and Milne's method did not lower this figure much since 2 per cent. of fatalities occurred. On the other hand, the method fulfilled a third claim, viz., that it prevents complications. This was strikingly true for such as endocarditis and nephritis, although arthropathies were present even in excess percentage. The treatment did not shorten the average duration of the disease. The author's results compare well with those most recently published in Great Britain as far as discouraging the claim that eucalyptus antagonizes the infectious element of the disease *in toto*. It is not denied that it is a good treatment, but may not be superior to the measures already in vogue. The future must determine this point.—*Medical Record*.

## SOCIETY REPORTS.

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### THE PHILADELPHIA PEDIATRIC SOCIETY.

*February 13, 1912.*

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

#### STUDIES IN THE DIGESTION AND NUTRITION OF INFANTS.

DR. MAYNARD LADD, of Boston, read this paper by invitation. After showing a large number of lantern charts of cases treated in the out-patient services Dr. Ladd gave the following conclusions: As a result of the study of 82 infants with varying grades of indigestion and malnutrition, it is evident that many atrophic infants can be educated to take higher fat percentages than are ordinarily given, with satisfactory results in weight development. The average rate of gain in atrophic and under-developed infants who are fed upon whey mixtures with lactose for prolonged periods was 13 ounces per month. When malt sugar was substituted for milk sugar in these mixtures the rate of gain was increased to  $22\frac{2}{3}$  ounces per month, or an increase of 26 per cent. Two series of infants were fed upon plain cream mixtures with barley starch, and the excess of sugar was supplied in the form of maltose (maltose and dextrimaltose). In one group the mixtures were not pasteurized; in the other group the food was superheated to  $212^{\circ}\text{F}$ . for twenty minutes. The rate of gain in each group was the same, that is,  $21\frac{1}{4}$  ounces per month. Boiling the milk did not in any way lessen its nutritive qualities. The possibility of scorbutus was guarded against after several weeks of feeding by small doses of orange juice. Individual cases often did better upon the superheated than upon the raw milk. With an occasional exception, the infants did not make satisfactory gains in weight until the energy quotient was raised to from 140 to 160, and sometimes to from 175 to 190. Generally speaking, the energy quotient is greatest when the weight development is farthest from that of the average normal infant, as determined by the weight chart. The quantity of food to be given an atrophic infant is only a little less than that which the normal infant of the same age receives and is often from

½ to 2 ounces more than would be given to the normal infant of the same weight. The detailed study of the weight and feeding charts in a large series of cases shows great variations in individual requirements and the impracticability of applying general rules of feeding to the atypical and difficult cases. (See also p. 324.)

DR. S. MCC. HAMILL considered that Dr. Ladd had struck the keynote of teaching infant feeding when he had said that it was impossible to teach general principles of infant feeding which would cover every case. The problem is to feed the individual infant; and it is also individual in that the physician advising the feeding studies his results upon that individual baby. It is the individual infant who has to be fed and the application of a special food to the special infant is the ultimate object of our work. Dr. Hamill has had success upon relatively low fats and relatively high proteids with slightly lower sugars than Dr. Ladd used.

DR. E. E. GRAHAM said that, in the study of the nutrition and digestion of infants there are certain broad principles which we can follow. It is necessary, first of all, to understand normal gastric and intestinal digestion in the infant. One should appreciate that in the stomach the proteid is at least partly converted into peptones; that sugars, salts and proteid are absorbed slightly from the stomach; that the younger the child the more quickly does the stomach empty itself and the higher the proportion of fat in the food, the more slowly does the stomach empty itself. In the intestine one should appreciate that the pancreatic juice acts on the proteid, carbohydrates and fats, and that there is a rapid absorption of proteid and fats from the small intestine, while absorption from the large intestine is poor; certainly from the latter very little fat is absorbed, although sugars, salts and peptones may be absorbed. One should also appreciate exactly what part the different elements of food play in the nutrition and heat function of the body. One should try to decide whether the infant under study, the stomach or intestine, or both, are involved. Many cases of malnutrition present no actual change in either the stomach or bowel. If possible, decide what element or elements of food are not being digested, and in feeding the baby try to make up the deficiency in one element by an added quantity of another. In other words, the individual child must be studied in each case. In the study of the stomachs of the patients Dr



Ladd showed in X-ray pictures, one must remember that these are not healthy children; that they have not normal stomachs and that the gastric contents do not leave such stomachs at normal periods. Moreover, many of these infants, as they were cases of malnutrition, may have had dilated stomachs.

DR. ALFRED HAND, JR., said that Dr. Ladd had presented an interesting subject in a very interesting way, one reason for the interest attached to infant feeding being that any given infant is not going to thrive on any given mixture simply because some other infant has, as is well illustrated by the chart of the case in which it was necessary to use milk sugar instead of maltose. Dr. Hand is glad to see that the principles that have guided him in endeavoring to meet the needs of different infants are fundamentally the same as those with which Dr. Ladd has worked, the main difference being that Dr. Ladd starts with somewhat lower percentages; the results are, however, very similar, as Dr. Hand could substitute a number of his weight charts for those of Dr. Ladd. In some cases which gain very slowly, we do not always have to consider the time as necessarily lost, if the infant is comfortable; for a time may soon be reached, especially if we are underfeeding a little, when the digestive organs have had sufficient rest and then an increase in the strength of the mixture is followed by rapid gain. Dr. Ladd is fortunate in his term of service in the hospital, the cooler fall months, for through the hot months here in Philadelphia it is often impossible to make some infants gain, but after the middle of August, when the nights usually begin to get cooler and better sleep is obtained, more satisfactory progress is made.

DR. D. J. MILTON MILLER, of Atlantic City, said that the great thing in infant feeding was to nourish the infant, not to feed it. Because this was forgotten much trouble ensued. Dr. Miller had not been so successful as Dr. Ladd in feeding fat to atrophic infants. They seemed to do better with relatively high proteids and maltose. One would gather from Dr. Ladd's remarks that he fed infants with fat regardless of the stools. Dr. Miller had not been successful in doing this until the indigestion was corrected. Some of the troubles of feeding were due to impure milk sugar. Through Dr. Henry L. Coit's efforts a pure milk sugar of the fourth crystallization was now obtainable. Dr. Miller had not been satisfied with caloric feeding according to the accepted standard; not only do atrophic infants require high calories, but



healthy infants, if fed according to the caloric requirements supposed to be suitable to their age, would, Dr. Miller found, be constantly hungry and crying for more food.

DR. LADD, in closing the discussion, said that while he started these infants upon low fats, for about two months, this was later increased gradually to between 3 and 4 per cent. He always noted the condition of the bowel movements, except in cases of starvation diarrhea, when he absolutely disregarded them. He agreed most heartily with the view that the same result could often be secured by different methods of feeding. The important point was to get results and this can generally be accomplished by intelligent and diligent study of the individual requirements of each infant.

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DIAGNOSTIC VALUE OF THE LEUKOCYTE INCLUSIONS IN SCARLET FEVER.—Kretschmer refers to an article on this subject by Döhle, who in 30 cases of scarlet fever of various stage and intensity found inclusions in the polynuclears. They are naturally at a maximum during the leukocytosis at the onset of the disease, and begin to vanish by the end of a week, persisting for a variable interval, which may amount to four weeks or more. There is evidently no connection between this phenomenon and later developments, for it does not reappear with relapses and complications. There is no claim made as to specificity, for Döhle found the inclusions in other miscellaneous conditions, in which there is no constancy of incidence. The author has studied the phenomenon in nonscarlatinal conditions and in the healthy; and in seventy of the most heterogeneous cases found the inclusions in four, or about 6 per cent. There is therefore a presumption at the outset that the phenomenon has to do with the streptococcus pyogenes, and, as a matter of fact, this view was borne out in every one of the positive finds. On the other hand, the author has not only found the inclusions in all the scarlatina cases investigated by him, but was even able to recognize the existence of the disease in an exposed child before it was seized by the latter. Moreover, he has excluded scarlatina in the early days of acute angina, Vincent's angina, and diphtheria. The author has been able to pick out the inclusion cases in non-labeled specimens. Several stains may be used, but the author prefers the so-called Manson's procedure, in which methylene blue is used. The inclusions are about the size of ordinary cocci.—*Medical Record*.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION  
ON PEDIATRICS.

*Stated Meeting, Held March 14, 1912*

WILLIAM SHANNON, M.D., CHAIRMAN.

INTESTINAL IMPLANTATION OF THE BACILLUS LACTIS BULGARICUS  
IN CERTAIN INTESTINAL CONDITIONS OF INFANTS,  
WITH REPORTS OF CASES. ✓

DR. RALPH OAKLEY CLOCK presented this paper, in which he stated that he had employed buttermilk extensively as a dietetic treatment for malnutrition, enteritis, etc., but the results that he had secured were not notably favorable. The bacillus lactis bulgaricus had been found to have a most pronounced effect upon putrefactive bacteria and it was the only lactic acid bacillus known that would survive ingestion, reach the large intestine, and continue to live there and to create nascent lactic acid which was antagonistic to the growth of the pathogenic bacteria. The writer stated that he had experimented with various preparations supposed to contain the bacillus lactis bulgaricus but secured no definite results, as most of the preparations on the market consisted chiefly of paralactic bacilli. At length he had obtained a pure culture of the bacillus lactis bulgaricus from John Hopkins Hospital, which institution had imported it from the Pasteur Institute. This culture was dried and mixed with milk sugar and compounded into tablets. As yet the literature contained no reports of this bacillus having been introduced into the system through this medium. The writer reported a number of cases which showed the results of this new method of treatment in bottle-fed babies. Some of the cases were of the most severe type of gastrointestinal disturbance, and yet a decidedly favorable result was obtained in every case. The introduction of the bacilli was followed by a disappearance of the gastric symptoms, a subsidence of the toxemia, and a disappearance of the mucus and blood from the stools. The stools became normal in color and consistency on the third or fourth day and there was no return of the intestinal trouble in any in-

stance. The treatment consisted solely in the administration of the bacillus lactis bulgaricus without any change in diet. In this way the reliability of the test as to the value of this treatment could not be questioned. Under the treatment all of the cases gained in weight. The cases varied in age from five weeks to ten months. Among the cases treated were 2 of enterocolitis and 20 of gastroenteritis, of which 5 were of the mild form, 9 of the severe type, and six of the toxic. The duration of the gastroenteritis, prior to instituting treatment, was from one day to five in the mild forms, from one day to two weeks in the severe forms, and from one to two weeks in the toxic forms. In the 2 cases of enterocolitis the condition had persisted for from two to four weeks. These cases had resisted other methods of treatment, but responded quickly to the implantation method. Decided improvement followed in every case within twenty-four hours after treatment was instituted. The average gain in weight was  $4\frac{1}{2}$  ounces. The tablets quickly dissolved in water and were readily taken by the babies. The results were complete and permanent in every case. Another advantage of this treatment was that it was unattended with any untoward effect, twenty tablets having been given in twenty-four hours to infants of five or six weeks of age. The treatment did not interfere in any way with the diet of the baby; it had been given to infants taking condensed milk, top milk formulæ, modified milk with Mellin's food, whole milk and barley water, peptogenic milk, whey and dextrinized barley gruel, and modified milk with sugar. He attributed the good results that followed in the case fed on condensed milk to the fact that the bacillus lactis bulgaricus flourished best in a rich carbohydrate medium, whether this medium was lactose, maltose, saccharose, or glucose. Vomiting invariably stopped on the second day, which seemed to be explained by the fact that after the putrefactive process was controlled the reflex condition in the stomach quickly subsided. The temperature which was present in all the cases of toxic gastroenteritis and in the enterocolitis cases quickly dropped to normal under the implantation treatment. After the stools became normal the dried culture was administered three times daily for a period of one or two weeks. He believed that the negative results that had been obtained previously with other dried cultures was due to the fact that there were few true bacilli lacti bulgaricus present.



DR. WALTER LESTER CARR said that the paper which Dr. Clock had read was very interesting because it contained many clinical suggestions. His statement regarding buttermilk was interesting to those who were feeding babies. The value of buttermilk in feeding these children could be obtained for a short time when it became necessary to increase the number of calories by adding milk or cream. During the past few years some gain had been made with regard to the use of the bacillus lactis bulgaricus in combating intestinal putrefaction; they were getting better results. Dr. Carr said that he could not see any particular reason for continuing milk in these cases; it was a culture medium. Some babies with intestinal infections had an idiosyncrasy for milk and he believed that the food that caused the disturbance should be "cut out" and then they could see what could be done without the use of medicinal agents. The author had stated that the time required to treat these children was one week; in most cases of gastrointestinal infection the period was shortened without the milk diet. Personally he would not think of beginning treatment by continuing the diet that was the source of the trouble. He would assent to beginning treatment in the subacute and chronic cases with a limited amount of milk, but he would not subscribe to the continuance of such a diet in the acute cases. It seemed to be a difficult problem at present to get the best cultures, as many of the preparations on the market did not come up to the standard.

DR. THOMAS S. SOUTHWORTH said that it might be stated that their views themselves regarding summer complaint were in a state of flux. There were those who believed the putrefactive bacteria to be the cause of such diarrheas, while others assigned this rôle to the bacteria of fermentation. There were those who would stop giving proteids and give carbohydrates, and those who would eliminate the carbohydrates and give massive doses of proteid casein. There were also those who took Dr. Clock's view that they might continue the customary diet of the patient provided they implanted lactic acid bacteria in the intestines, as these would crowd out the putrefactive bacteria, but it was also possible that the transformation of the carbohydrates by the lactic acid bacilli might tend to prevent their being split into byproducts which were more irritating to the intestine.

DR. L. E. LA FÉTRA expressed himself as very much interested in Dr. Clock's contribution to the clinical study of this



subject. The paper was very suggestive and Dr. Clock's courage admirable in continuing the use of the high fat mixtures in these cases of diarrhea. The length of time that the babies were under treatment seemed rather long when one took into consideration the results. In hospitals these cases with high temperature and frequent stools did not last so long. It seemed to him that other methods might be employed in addition to the treatment with the *bacillus lactis bulgaricus*; the diet might be changed with advantage to the patient. Of course in these cases Dr. Clock did nothing else in order to prove his thesis. Dr. La Fétra asked Dr. Clock about the loss of weight in these cases; some of them had been sick a long time and a loss of weight would be expected. He also asked how the lactic acid acted when given in condensed milk which contained so much cane sugar. At the Babies' Hospital some years ago the implantation of lactic acid bacilli, furnished by Dr. Charles North, in the rectum was used in connection with pure cultures by the mouth. The results of the treatment were so bad that it was discontinued the following season. Dr. La Fétra said that his impression regarding the lactic acid bacilli was a most favorable one, but he had not used the same sort of cultures as Dr. Clock. His experience with the lactic acid milk had been fairly satisfactory. He had obtained the best results in diarrheas from the use of protein milk. One could use lactic acid milk made with the pure cultures of the *bacillus lactis bulgaricus* and get good results in these cases.

DR. GODFREY R. PISEK said that five years ago he had advocated the use of lactic acid bacteria in the treatment of diarrheas in which there were so many of the intestinal flora propagated. After a thorough trial he now believed more in the old-fashioned method of treatment with calomel, castor oil, and the use of the temporary restricted diet. He was surprised at the good results obtained, which he would not have believed possible except in private practice, where the children were previously in good health and had the best hygienic surroundings. There was no doubt in his mind that he had obtained some beneficial results by the implantation method, not in the acute cases, but in the subacute or chronic cases, such as ileocolitis. If one fed large quantities of the lactic acid bacilli to these infants who had been previously starved, the intestinal flora were changed and this might give the infant a better chance to recover.

DR. RALPH OAKLEY CLOCK, in closing the discussion, said that with regard to Dr. Carr's question as to the reason for not changing the diet, his purpose was to test the reliability of the bacillus lactis bulgaricus as a means of combatting intestinal putrefaction. He presented his paper simply to show the results of these preliminary tests. In answer to Dr. Le Fétra's question regarding the loss of weight, the Cuban case of enterocolitis had lost nearly 2 pounds in the four weeks previous to the time that he had seen the case; during the time that the case was under treatment with the culture of the lactic acid bacilli, there was marked improvement, although there was an initial loss in weight of 3 ounces. The favorable results that followed when the infant was fed on condensed milk might be explained by the fact that the bacilli flourished best in a rich carbohydrate medium, and although the condensed milk contained cane sugar the two sugars were not antagonistic. With regard to the alleviation of the gastric symptoms, the lactic acid bacilli had, of course, no direct effect upon the vomiting, but after the putrefactive action in the intestines had been controlled the reflex gastric symptoms subsided.

THE PATHOLOGY AND TREATMENT OF CHRONIC STENOSIS OF THE  
LARYNX FOLLOWING DIPHTHERIA

DR. HENRY LOWNDES LYNNAH presented this paper. In discussing this subject he classified the different types of laryngeal stenosis following diphtheria into six groups: (1) *The nervous type*. This was accompanied by a marked element of fear of impending danger. The patients were often in a condition bordering on convulsions when brought to the table. Frequently in these cases a marked spasm made extubation difficult and when the tube was raised it would slip off the jaw of the extractor and be sucked back into the larynx. When the tube was finally removed there would be a violent spasm and reintubation would be necessary. General anesthesia would overcome this condition though the spasm would return when the patient awoke. (2) *The spasm type without nervous element*. This condition was due to the long-continued wearing of the tube which caused a temporary functional disuse of the intralaryngeal muscles. This condition did not come on suddenly, but usually after the patient had been returned to the ward breathing naturally. The spasm might even be delayed for several hours or might occur

during sleep. It necessitated reintubation. In both of these types the dyspnea was inspiratory and accompanied by a loud stridor. (3) *The type with marked polypoid growth at the base of the epiglottis and the ventricular bands.* These latter fell together when the pressure of the tube was released, causing obstruction and necessitating reintubation. Under general anesthesia these patients would breathe, though with difficulty. (4) *The hypertrophic subglottic type.* In this type the stenosis was slow and gradual and accompanied by both inspiratory and expiratory dyspnea. Reintubation was necessary sooner or later in these cases. While the contraction usually occurred at the cricoid cartilage, it might involve the entire lumen of the larynx. This type was exceedingly difficult to reintubate and one should never wait until grave stenosis supervened. (5) *The cicatricial type.* This was due to traumatic or surgical interference and might embrace the following: (a) Tracheotomy made imperative when it was impossible to intubate or where false passages had been made at the primary intubation. (b) Tracheotomy to save life in the persistent auto-extubation stage or in the extreme grade of hypertrophic contraction. (c) Cicatrices resulting from chronic tracheal canulæ cases, accompanied by atresia of the disused larynx above the canula, and by polypoid hypertrophy about the canula and on the posterior wall. (d) Laryngotomies for the purpose of dissecting out the hypertrophic connective tissue. (6) *The atrophic type.* This type occurred in a few cases which had recovered after long treatment, but suffered from muco-crusts which obstructed the larynx. There was an extreme grade of dyspnea and loss of voice in this type. The basis for this condition was laid in the beginning with the acute diphtheritic exudate and the primary intubation. In cases in which the exudate resolved early the patient was able to remain without the tube on the first extubation. In other instances the tube virtually acted as a foreign body, producing ulcerations which added to the necessity of prolonged intubation. These pressure ulcerations were most marked at the cricoid cartilage and when of sufficient degree caused necrosis with absorption of the whole ring of the cricoid with the sequelæ of persistent auto-extubation. The firm cartilaginous larynx was converted into a collapsible tube. Involvement of the recurrent laryngeals in such cases due to diphtheria was extremely rare. This auto-extubation stage was one of the most frequent causes of subacute



and chronic cases and were it not for bronchopneumonia, which carried off most of these patients, the percentage of chronic stenosis would be considerably greater than one per cent.

These various types seldom occurred singly and all required prolonged intubation in order to affect a cure. For the first type, the nervous and spasm type, an extremely narrow necked tube should be used that would allow for lumen. It was difficult to get these tubes with the extremely narrow neck, and Dr. Lynah said that he had devised a tube by taking out the posterior portion below the head directly into the lumen; this enabled the patient to breathe, gave motion to the cords and gave the posterior cricoid aretenoids a chance to work by taking pressure off the muscle. When polypoid growths were the cause of spasm this tube had to be removed and a wider necked one substituted in order to press out the polypoid masses. A tube with a large head was also necessary. For the hypertrophic type gradual dilatation with special tubes graduated in millimeters with increasing diameters should be used. The tube should dilate antero-posteriorly as well as laterally; this was accomplished by the cigar-shaped tube devised by the writer. These tubes were gradually increased in size until the largest possible dilatation was accomplished. In some cases this extreme dilatation would cause spasm. The treatment of the cicatricial type was also by dilatation, but when the fistula was low a special tube with the greatest diameter from the retention swell downward should be used. When there was chronic stenosis from long wearing of a tracheal canula and closure of the larynx above dilatation should be accomplished from the tracheal fistula upward by means of sounds and then a suitable dilating tube introduced. In intubating these cases the tube as it entered the trachea would ride over the obstruction and appear in the wound; to overcome this, firm pressure should be made on the intubation tube at the site of the fistula to mash out the posterior hypertrophy and to allow the tube to pass into the trachea. The tube used should be a post tube which had a device screwed into the tube to prevent its being dislodged during coughing. The tracheal fistula should be curetted and all polypoid tissue removed, the edges sacrificed and the wound closed about the post. This tube should be worn for a month and then changed for a dilating tube. The author said that he had abandoned laryngotomy in these cases as futile, for a pure cicatrix was thereby added to an already complex



pathology. The atrophic type with the thick muco crusts, after a cure had been effected, should be treated by intralaryngeal medication. He had found Mandel's solution or iodine petrogen useful, or the internal administration of the iodides and steam inhalations. He had had cases of this type in which the patient was unable to cough out; each time he reintubated only to have this thick, ropy, crusty mass coughed out through the lumen.

DR. WILLIAM P. NORTHRUP said that he was present because he was the oldest living intubationist. He was making autopsies at the Foundling Hospital at the time that Dr. O'Dwyer was perfecting his intubation tubes. The very first might be called "dodgers." When flying out after a good cough you had to dodge them. They were the first bivalves. The next modification was shaped something like a chimney-pipe. When introduced not only did they hold but they were hard to get out. For fully five years Dr. O'Dwyer worked over his tubes perfecting them, and during this same time he (Dr. Northrup) was making the autopsies of the institution. The work was like confinement work, one could not get away. When once called to intubate you were bound to get there. Dr. O'Dwyer, Dr. Brown and Dr. Northrup were the ones who were doing the work in those days. The first paper on this work in laryngeal stenosis was written by Dr. O'Dwyer, and he was asked to present it before the British Medical Association. He could not go but ordered Dr. Northrup to present his claims before the Queen and the British Medical Association. Dr. Northrup did so. That was the first paper of that character ever printed. He said he had been greatly edified by the work of the reader of the paper, and he felt that they all appreciated his work in this particular line.

DR. JOHN ROGERS commended Dr. Lynah for the work he was doing along this line. He said that few men understood the cause and treatment of laryngeal stenosis of the larynx. Dr. Rogers said that he was interested in the subject, as cases turned up on whom tracheotomy had been performed and in some instances they were considered hopeless by the best surgeons. He believed that all of these cases could be cured by this method and that no case of laryngeal stenosis should be considered hopeless. His experience with the metal tubes had led him to look upon them as dangerous, as they became coated with calcium

material and practically occluded the tube. He thought Dr. Lynah's time of treatment rather short. An average period of two years was usually required to cure these fibrous structures.

DR. MATTHIAS NICOLL, JR., said that he had had occasion to congratulate Dr. Lynah before on his excellent work in the alleviation and cure of these pitiful cases and he did so now since he had come to know how great were the difficulties which surrounded the study of their pathology. It was obvious that intubation, even when performed under the most auspicious circumstances, chronic stenosis would occur in a small percentage of cases. What chance then had a bungling operator to escape this condition? New York was full of "half baked" intubationists for whom the medical schools were responsible. The usual instruction was entirely inadequate and consisted in a little instruction and the trial by each student of putting a tube into the larynx of a cadaver. Would a teacher of diseases of the nose and throat consider his students after receiving a routine medical course without special training, fitted to perform catheterization of the Eustachian tube or the genitourinary teachers a catheterization of the ureters? Yet lack of skill in these two operations would only be followed by negative results, discomfort and waste of time, while in the case of unskilful intubation the result was frequently death, or perhaps a patient crippled for life. Dr. O'Dwyer frequently stated that it was infinitely better to perform a tracheotomy than a bungling intubation. Laryngologists rarely performed this operation by touch, and it was therefore left to the pediatricist with special training. It was the duty of these men to see that the operation was properly taught to those who desired to become specialists in this line. Finally there was a great deal of ignorance in regard to the signs and symptoms of laryngeal stenosis. Dr. Nicoll said he had been called upon to intubate cases of clearly defined bronchopneumonia on several occasions, catarrhal croup on several occasions, and one case of meningitis. Pneumonia was frequently, without question, intubated in mistake for laryngeal diphtheria. It might be of interest for those present to know that at the Willard Parker Hospital cases were received which were said to have been intubated, the tube later passing through the bowel.

DR. HENRY W. BERG congratulated Dr. Lynah upon the subjects he had brought up for discussion. At the Willard Parker

Hospital they tried to teach the internes how intubation should be done. In 1903 Dr. Berg had reported 14 chronic tube cases in a monograph which discussed the causes, pathogenesis and clinical features of such cases. It was interesting that of 578 cases of intubation then reported 221 made recoveries. Among these there were 17 chronic tube cases with 7 recoveries and 7 deaths and 3 discharged to other institutions. The length of time the tubes were left in varied from two and one-half to eighteen months. No modified tubes were used, only the O'Dwyer tubes. He had been particularly interested in the pathology of these cases and found that there were practically two types of lesions in every case that came to autopsy after intubation. First, there were lesions due to pressure of the tube, simple superficial ulcerations or decubitus sores; secondly, there were deeper ulcerations going so deep as to go through the mucous membrane and even to destroy the cartilage with abscess of the surrounding soft structures. The decubitus sore should be brought up as an etiologic factor because it kept up the edema and necessitated intubations one after the other. It was important to keep in mind that cases of autoextubation the child might collapse, and if the tube was not at once inserted immediate death would follow. Of the 14 cases of chronic tubes there were 6 auto-extubation cases reported in the paper referred to. It was a great problem to decide what to do with these cases. Dr. Berg believed that the dangerous type of auto-extubation was often due to paralysis of the recurrent laryngeal nerve. The larger number of decubitus sores occurred at the junction of the cricoid and thyroid cartilage. It should be remembered that a muscle could be deprived of motor power by neuritis of its smaller branches. If a branch supplying a muscle showed only a slight neuritis, at one point only, it meant paralysis to a certain extent. If there was paralysis of one cord the tubes might be coughed up. Dr. Berg said he could not imagine any spasm lasting eighteen months as a case of laryngeal stenosis. Spasm was not a cause of persistent intubation of the larynx at all. These cases might require two, three, four or even five intubations and then they got well. With regard to the treatment there was one tube presented by Dr. Lynah which he would not like to attempt to push through the cricoid; the diameter of the tube below the retention swell was larger than it should be, and when it was inserted there was danger of fracturing the cricoid



cartilage, and then, after removal of the tube, the cricoid would collapse. Some of the other tubes presented some good and some bad features. He believed that every time they attempted to modify Dr. O'Dwyer's tubes they did so at the peril of the child. He thought that five years from now Dr. Lynah would not use all of the tubes he had presented, but would adhere closer to Dr. O'Dwyer's type of tubes.

DR. LOUIS FISCHER said that the two principal rules in intubation and extubation were: (1) Avoid force and thereby injury. This rule had been of the greatest help in avoiding retained tubes. (2) Do not hurry. While a certain amount of haste was necessary in selecting tubes and asking preparations, when it came to the introduction of the tube the inflammatory process and the subnormal condition should be remembered and hence the advice "go slow." It had been his rule to give an antispasmodic for twelve hours before extubation; codein, one-quarter grain or one-third of a grain should be given to a child two years of age or over or ten-grain doses of sodium bromide with two grains chloral hydrate repeated in six hours (two doses only) might be given. Dover's powder was also valuable as an antispasmodic. Intralaryngeal medication consisted in applying a coating of medicated gelatin to each tube. Ten per cent. orthoform in gelatin or ichthyol gelatin had served well in a case of persistent tube reported seven years ago. Owing to the thickness of the coating of gelatin a tube one size smaller than otherwise was used. Decubitus due to pressure lent itself readily to this plan of treatment. There was considerable danger in the abrasion of the mucous membrane of the pathogenic bacteria migrating to the deeper structures, where they might set up peritracheal or perilaryngeal abscess.

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CEREBROSPINAL FLUID IN ACUTE POLIOMYELITIS.—J. G. Forbes (*Lancet*, November 18, 1911) reports the results of the examination of the cerebrospinal fluid in 30 cases of poliomyelitis. The relation between an increase in amount of albumin and the presence of lymphocytes in excess appears to be fairly constant, and may reasonably be taken as evidence of tissue reaction in the presence of the hitherto unrecognized virus—a reaction shown in sections by the perivascular lymphocytic infiltration in the substance of the cord, and also seen in the spinal meninges.—*Medical Record*.



## MISCELLANEOUS.

### AMERICAN PEDIATRIC SOCIETY

#### PRELIMINARY PROGRAMME.

*Twenty-fourth Annual Meeting to be held at Hot Springs, Va.,  
May 29, 30 and 31, 1912*

WEDNESDAY, MAY 29TH—OPENING SESSION—10 A.M.

1. President's Address: Walter Lester Carr, M.D., New York.
2. "Importance of Dentistry in Relation to Disease,  
Harold Williams, M.D., Boston.
3. "The Sources and Paths of Meningeal Infections,"  
David Bovaird, Jr., M.D., New York.
4. "A Brief Report of an Epidemic of Sore Throat, with In-  
volvement of the Cervical Lymph Nodes,"  
John Ruhräh, M.D., Baltimore.
5. "Coagulation of Blood in Infancy and Childhood,"  
Howard C. Carpenter, M.D., and  
J. C. Gittings, M.D., Philadelphia.
6. "The significance of the Pyloric Reflex in the Treatment of  
*True and Pseudo Pyloric Stenosis*,"  
D. M. Cowie, M.D., Ann Arbor.
7. Subject to be Announced, Matthias Nicoll, M.D., New York.

SECOND SESSION—3 P.M.

8. "Congenital Obstruction of the Membranous Urethra: Re-  
port of a Case in a boy Five Years of Age, with Sym-  
ptoms Suggestive of Congenital Cystic Kidneys,"  
J. H. Mason Knox, Jr., M.D., and  
Thomas P. Sprunt, M.D., Baltimore.
9. "Serum Treatment of Pneumonia,"  
Rowland G. Freeman, M.D., New York.
10. "Acute Yellow Atrophy in a Child Three Years Old,"  
Francis Huber, M.D., New York.
11. "A Study of the Metabolism in Amaurotic Family Idiocy,"  
Henry Heiman, M.D.,  
Samuel Bookman, M.D., and  
Burrill Crohn, M.D., New York.
12. "Trials of the Phenolsulphonaphthalene Tests for Kidney  
Function in Children,"  
Henry D. Chapin, M.D., New York.
13. Subject to be Announced,  
George N. Acker, M.D., Washington.

## MEETING OF COUNCIL. 8:30 P.M.

## THURSDAY, MAY 30TH—THIRD SESSION—10 A.M.

14. "The Carbon Dioxid Metabolism of Normal Babies,"  
Fritz B. Talbot, M.D., and  
Francis G. Benedict, M.D., Boston.
15. "Some Fundamental Principles in Studying Infant Metabolism,"  
Fritz B. Talbot, M.D., and  
Francis G. Benedict, M.D., Boston.
16. "Concerning Scurvy and Modern Conditions,"  
William P. Northrup, M.D., New York.
17. "Faulty Development in Children,"  
Charles G. Kerley, M.D., New York.
18. "The Use of Maltose in Infant Feeding,"  
Thomas S. Southworth, M.D., New York.
19. "Maltose in Infant Feeding,"  
John Lovett Morse, M.D., Boston.
20. "An Analysis of Cases of Typhoid Fever in Infancy,"  
J. P. Crozer Griffith, M.D., Philadelphia.

## FRIDAY, MAY 31ST—FOURTH SESSION—10 A.M.

21. Business Meeting.
22. "The Wassermann Reaction in Infants and Children—A Clinical Study," Frank S. Churchill, M.D., Chicago.
23. "The Employment of Salvarsan in Infants and Young Children," Linnæus E. LaFétra, M.D., New York.
24. "A Graphic Chart Method of Studying and Teaching the Principles of Infantile Nutrition, with Particular Reference to the Importance of the Energy Line,"  
D. M. Cowie, M.D., Ann Arbor.
25. "Weight Charts of a Dozen Cases of Artificially-fed Babies,"  
Percival J. Eaton, M.D., and  
Edward B. Woods, M.D., Pittsburgh.
26. "Age and Seasonal Incidence of Diseases of Children,"  
Charles Hermann, M.D., New York.
27. "The Relation of Heat and Humidity on Infant Mortality: A Study of Weather Conditions and their Effect on Infant Mortality for the Past Ten Years, in Boston, with Special Study During the Summer, 1911,"  
William Palmer Lucas, M.D., Boston.
28. "The Influence of Milk Stations on Infant Mortality,"  
Samuel S. Adams, M.D., Washington.
29. Subject to be Announced, Francis Huber, M.D., New York.

## CURRENT LITERATURE.

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### ABSTRACTS IN THIS NUMBER BY

DR. T. WOOD CLARKE.  
DR. CHARLES E. FARR.  
DR. S. FELDSTEIN.

DR. C. D. MARTINETTI.  
DR. RICHARD M. SMITH.  
DR. S. W. THURBER.

### DISEASES OF EAR, NOSE AND THROAT.

YOUNGER, CHARLES B.: PUBLIC AGITATION AND SOME UNNECESSARY ADENECTOMIES. (*The Journal of the American Medical Association*, January 13, 1912, p. 111.)

Younger contends that the diagnosis of adenoids is too frequently made on imperfect examination and that even this trivial operation should not be performed without good cause. Every child has normally a small mass of lymphoid tissue in the nasopharynx, varying in size and position. The symptoms depend largely on the situation of the mass and the relation between its size and the dimensions of the nasopharyngeal cavity that contains it. A fair-sized growth within a spacious nasopharynx will cause little or no disturbance of nasal breathing. On the other hand, there are many causes of mouth-breathing besides adenoids, and the diagnosis, therefore, should not be based upon mouth-breathing, upon irregularities of the teeth or a high-arched palate. The author urges against snapshot methods and indiscriminate operating in this class of case, especially because of our limited knowledge of the physiology of these tonsillar structures.

CHARLES E. FARR.

FRIDENBERG, PERCY: THE EAR AND SOCIAL HYGIENE. (*Annals of Otolaryngology and Rhinology*, December, 1911, p. 784.)

This article is a plea for the same consideration for the care of the ear as is given to the eye. Much has been done in the regulation of illumination, decoration of buildings, legibility of type, etc., but the problems of excessive noise and other ear strains have been heretofore neglected. The proposed installation on the elevated roads of a device to lessen the noise is a step in this direction. We are beginning to reap the fruit of persistent effort in the general recognition by the laity of the dependence of hearing and sound cars on the normal condition of the upper respiratory tract. The deaf almost automatically exclude themselves from social relations and world interests, while blindness has no such sequelæ.

Articulate speech is formed under the control of the double function of sound and rhythm perception and the author does not think sufficient attention has been paid to the sense of rhythm and time which are concepts of auditory origin. A pleasant voice is almost as important as a sense of melody and a good ear is associated with a good voice. Other factors than unnecessary noises and the din of traffic injure the ear and they are those that produce nasopharyngeal irritation, such as dust, gasoline-filled atmosphere and poor ventilation, altitude, diseases of childhood, syphilis and tuberculosis.

S. W. THURBER.

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### PATHOLOGY.

THOMPSON, DAVID: THE REMARKABLE DAILY VARIATION IN LEUKOCYTES IN SEVERAL DISEASES. (*British Medical Journal*, December 16, 1911, p. 1,586.)

The author reports an examination of blood made every four to eight hours on patients ill with malaria, Hodgkin's disease and cancer. In malaria during the sporulation of the parasites the percentage of mononuclear leukocytes falls markedly, and where many parasites are present the total leukocyte count is also low. Simultaneously with the fall of temperature the leukocytes increase in number and also the percentage of mononuclear leukocytes rises. This leukocyte variation is much more delicate than the temperature change and persists even after the disease is apparently cured. The author believes this is due to the fact that a small number of parasites are still alive and sporulating but are too few in number to cause a temperature reaction or to be detected even in a prolonged microscopic investigation. When the parasites are very numerous there tends to be a constant leukopenia, but as the number of parasites decreases the leukocytes increase. Similar investigations made on patients ill with Hodgkin's disease showed a marked daily variation in the number of leukocytes, occasionally from six to seventy-five thousand. Leukocyte variation takes place during periods of freedom from fever and tends to be more marked during the afebrile period. There was also marked variation in the percentage of mononuclear leukocytes.

RICHARD M. SMITH.



## SURGERY.

STILES, HAROLD J.: PATHOLOGY AND TREATMENT OF TUBERCULOSIS OF THE BONES AND JOINTS. (*The Journal of the American Medical Association*, February 24, 1912, p. 527.)

Stiles presents the subject of bone and joint tuberculosis in a manner entirely worthy of his great experience. A large proportion of surgical tuberculosis, at any rate in children, is of bovine origin and is particularly common in Scotland because of inadequate inspection of cows and of the gross ignorance of the farmers and the public generally. The bacilli enter the body through the tonsils and adenoids, the lungs and the intestine, whence they are carried to the neighboring lymph nodes and the blood stream. The localization of the disease is accounted for by the distribution of the intra-ossal vessels, and in children is more frequent in the growing end of the diaphysis (the metaphysis), than in the epiphysis. The joints which are most often and earliest involved, secondary to an osseous focus, are those which possess small epiphyses, viz., those at the hip and elbow. In the rare instances in which the disease begins in an epiphysis, it does so more especially in those which are relatively large and which begin to ossify early, viz., those at the knee. The reason why primary bone foci are so much more frequently met with at the elbow than at the shoulder or wrist is that the nutrient arteries of the humerus and bones of the forearm are all directed toward the elbow, and the same fact probably explains why a tuberculous focus is more frequently met with in the upper than in the lower metaphysis of the femur. The frequency of tuberculous dactylitis is also accounted for by the blood supply of the bones. Tuberculous diaphysitis of the long bones proper is probably commoner in children than has hitherto been supposed, and the condition has no doubt often been regarded as syphilitic or as due to a subacute pyogenic infection. A circumscribed focus of tubercle in the metaphysis should, if possible, be removed by operation before the adjacent joint becomes involved, either by cureting or by a sub-periosteal resection. In the majority of cases tuberculous diaphysitis should be treated by sub-periosteal resection rather than by cureting, except perhaps in the case of the femur. If the metaphysis is also involved the affected portion of bone is divided and wrenched away from the epiphyseal cartilage, the latter adhering always to the epiphysis.

If this be done before the periosteum has become diseased, its bone-forming properties are such that it is capable of completely reproducing the removed portion. In the after treatment extension is applied to prevent shortening or angular deformity of the periosteal tube. To obtain a stable weight-bearing leg after excision of the head and neck of the femur, the leg should be placed in the abducted position with the trochanter planted firmly into the acetabulum, and the muscles stitched back over it. After excision of the knee, nailing of the tibia to the femur greatly helps the after treatment and insures osseous ankylosis in good position. The same thing may be done at the ankle joint. In the elbow joint it is often necessary to combine excision with subperiosteal resection of a considerable portion of the humerus or of the radius and ulna.

This article is one of the most complete presentations of this difficult subject in recent years, is splendidly written and well illustrated with excellent photographs and radiographs.

CHARLES E. FARR.

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## ORTHOPEDIC SURGERY.

MUSKAT, G.: PREVENTION OF FLAT-FOOT IN CHILDREN. (VERHUTUNG DES PLATTFUSSES IM KINDLICHEN ALTER.) (*Archiv für Kinderhk.*, Stuttgart, November, 1911.)

Muskat quotes the German army statistics to the effect that 10,000 conscripts are rejected yearly because of flat-foot, about  $2\frac{1}{2}$  per cent. of the total. Of these only about 4 per cent. are congenital, the remainder being acquired. About 5 per cent. of these latter are traumatic in origin, 3 per cent. paralytic, 3 per cent. rachitic. This leaves 89 per cent. due to improper use of the foot and emphasizes the need of greater care for the feet in childhood and for exercising the toes and ankles and for proper training in standing and walking. The feet should be placed parallel, turning neither in nor out, the stockings and shoes should fit well and not be narrow nor pointed. The prophylaxis of flat-foot should consist not in wearing supports, but in teaching children to use their feet properly in standing and walking, and especially in sports and exercises.

CHARLES E. FARR.

## MEDICINE.

HARRIES, ERIC H. R.: "COMFORTER CARIES." (*The Lancet*, November 11, 1911, p. 1,327.)

The author reports a series of cases of children, in other respects healthy, in the neighborhood of three years of age, who, owing to the constant prolonged use of the comforter showed marked hypertrophy of the upper lip and extensive caries of the two upper central incisor teeth. To quote: "If there be some other factor of a general nature causing this early caries, it is curious that no other teeth were affected. Whether the condition is produced by some direct action of the rubber on the teeth or whether it is due to the introduction of septic matter which is scraped off by and worked around the upper incisors, I am unable to say. Possibly both factors are at work. The hypertrophy and asymmetry of the upper lip noted in these cases can readily be understood.

T. WOOD CLARKE.

BOGGS, THOMAS R.: PERCUSSION SIGNS OF PERSISTENT OR ENLARGED THYMUS. (*The Archives of Internal Medicine*, 1911, Vol. VIII., p. 659.)

The thymus gland, high in the superior mediastinum, lies close to the sternum, and is not covered by the lungs. The left lobe is longer than the right, and often extends to the fourth rib in infants. The gland is attached by one or two suspensory or thyrothymal ligaments to the lower lobes of the thyroid glands, which are in turn fastened to the hyoid bones and the mandible by fairly continuous ligaments or muscles. In the normal adult thymus, the gland substance is too thin to be appreciated on percussion, but when enlarged or persistent, dullness can be made out in the first, second, and sometimes in the third left, and in the first and occasionally the second right interspaces. Thymus dullness lies higher up and is more superficial than that produced by enlarged mediastinal glands. The latter, and also tumors, aneurism, etc., are fixed by adhesion. Thymus dullness is more marked on the left than the right of the sternum. Thymus dullness is movable in the following manner: The patient sits up and depresses the chin toward the sternum; the dullness is outlined. The head is then retracted as far as possible and the dullness is again percussed. If thymic, the dullness will be found to have moved up one or more interspaces. In some cases, while there



is dulness in the second and third spaces, the first is clear. In such cases the shifting of the upper border can be demonstrated. The movability of thymic dulness is a physical sign not previously mentioned in the literature on physical diagnosis.

T. WOOD CLARKE.

LEDERER, R., AND STOLTE, K.: THE SCARLET HEART. (*Jahrb. für Kinderhk.*, October 4, 1911, p. 395.)

Abnormalities in cardiac action were seen in 70.5 per cent. of the cases (55 in all). On physical examination, the patients showed one or more of the following changes in the heart: Weakness or absence of the first sound, accentuation and reduplication of the second pulmonic sound, systolic murmur, bradycardia, tachycardia, arrhythmia and occasional dilatation. The murmurs did not have a pericardial character, but were soft, blowing and musical. These changes seemed to have no relation to the general condition, severity of the disease or the temperature. Occasionally, these symptoms appeared after the temperature had fallen to normal. Under three years of age they were extremely rare. There was a close association with the body weight. They were observed only when the weight was decreasing, and disappeared at once with beginning increase in weight. A glance at the weight chart would show equally as well as a physical examination whether cardiac symptoms were present or not. That they were not due to local inflammatory process in the myocardium, endocardium or pericardium was shown by the fact that by themselves they were never a cause of fever. Moreover, cardiac dilatation was present only in those cases that had lost  $\frac{3}{4}$  kg. of weight. All the signs completely disappeared as soon as uninterrupted gain in weight occurred.

Experimental work on dogs was undertaken to determine, if possible, if these changes are due to chemical changes in the heart muscle. By repeated injections of diphtheria toxins, disturbance in cardiac action of the same nature as those seen in the scarlet cases took place. Chemical examination of the heart did not show any constant departure from the normal.

The intimate connection with the changes in the body weight leads the authors to attribute the cardiac phenomena to transitory diminution in the volume of the blood, resulting in lowering of the blood pressure. Temporary cutting off of the peripheral circulation, as effected by raising of all four extremities, com-



pression of the abdominal aorta or vigorous faradization, produced temporary disappearance of the cardiac murmurs.

S. FELDSTEIN.

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### THERAPEUTICS.

WELCH, J. E.: NORMAL HUMAN BLOOD SERUM IN MELENA NEONATORUM AND OTHER CONDITIONS. (*The Therapeutic Gazette*, February, 1912.)

The author has had a very large experience in the use of human blood serum for the treatment of various hemorrhagic diseases such as melena neonatorum, hemophilia, and uncontrollable epistaxis. Alien sera are not without grave danger, while human serum from proper subjects and properly used is perfectly harmless. Large quantities of serum are given subcutaneously, as much as 1,034 c.c. in a case of hemophilia in a five-year-old child, in the course of five days. In one very hopeless-looking case, a newborn child weighing 5 pounds, 12 ounces, 630 c.c. of serum were used in the course of seven days, with recovery. Welch considers that the beneficial effect upon the bleeding is due to the action of the serum upon the endothelial cells lining the blood vessels. The method is far simpler and safer than transfusion, and promises as well in suitable cases.

CHARLES E. FARR.

LOMBARDO, S.: ON THE PASSAGE OF MERCURY FROM MOTHER TO FETUS. (*GIORN. ITAL. MALAT. VENEREE*, 1910.)

Upon injecting Hg salts in female guinea pigs and rabbits the tests made upon the fetus gave negative results, while the mothers' tissues always showed traces of Hg. Histological researches demonstrated renal lesions in the fetus only if the dose administered to the mother was large. Chemical tests detected mercury in extremely small amounts in 6 cases out of 10 examined. The test applied to a human fetus whose mother had been treated with thirty injections for curative purpose was also negative.

C. D. MARTINETTI.

DI CRISTINA, L.: SERUM TREATMENT OF ERYSIPELAS OF NEWLY-BORN. (*Gazz. Osped. e Clin.*, 1911, No. 74.)

The author deplores the lack of uniformity in results fol-

lowing serum treatment. One case ended favorably by having had injected 20 c.c. of antistreptococcic serum every twenty-four hours until temperature abated. The third dose brought a slight rash that rapidly disappeared. C. D. MARTINETTI.

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## INFANT FEEDING.

STOLTE, K.: THE FACTORS CONCERNED IN THE PRODUCTION OF FORMED STOOLS. (*Jahrb. für Kinderh.*, October 4, 1911, p. 367.)

Formed stools are due to the presence of calcium soaps. These can occur only when fat and calcium are present in sufficient quantities in the food. This fact explains the non-occurrence of formed stools when whey, fat-free milk, or fat-free buttermilk, is given. In whey there is a deficiency of both fat and calcium, owing to their chemical or mechanical removal in the process of curd formation. In albumen-milk ("eiweissmilch") the relative proportion of calcium to fat is greater than in whole milk. It contains the entire calcium of  $\frac{1}{2}$  liter of buttermilk and a considerable proportion of the calcium of 1 liter of milk, whereas the fat content is only  $\frac{2}{3}$  to  $\frac{3}{4}$  of whole milk. It is this relative increase of calcium to fat that determines the occurrence of soap-stools after the administration of albumen-milk. In the presence of a sufficient amount of calcium the fatty acids which result from the splitting up of the fats and which, when free, produce irritation of the intestinal mucosa, form calcium soaps, which are insoluble and thus non-irritating. In malt-soup, a food which, as is well known, is effective in the removal of soap stools, the ratio of calcium to fat is even less than in whole milk. This explains the looseness of the bowels often seen after administration of malt soup.

The author found that the addition of lime-water (1 to 3 teaspoonfuls to a feeding) was an effectual means of producing formed stools in cases of diarrhea. However, a recurrence of the diarrhea on addition of carbohydrates resulted more frequently with the use of such a food than with albumen-milk. In albumen-milk there is an additional inhibitory action on carbohydrate fermentation as a result of the putrefactive changes which the casein undergoes. S. FELDSTEIN.

## MISCELLANEOUS.

SCHLUTZ, F. W.: A STUDY OF THE PYROGENIC ACTION OF LACTOSE. (*American Journal of Diseases of Children*, February, 1912, p. 95.)

The author reviews the recent literature relative to the supposed fever-producing quality of solutions containing lactose and then reports experiments with intravenous, subcutaneous and oral demonstration of lactose and the determination of temperature. He concludes that lactose given in any of these ways has no distinct pyrogenic effect provided the animal has a normal intestinal tract. It may produce an influence on the temperature in subcutaneous and mouth administrations if the animal has a diseased intestinal tract and if given in conjunction with a solution containing salt.

RICHARD M. SMITH.

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BOOK REVIEW.

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DISEASES OF INFANCY AND CHILDHOOD. THEIR DIETETIC, HYGIENIC AND MEDICAL TREATMENT. A TEXT-BOOK DESIGNED FOR PRACTITIONERS AND STUDENTS IN MEDICINE, by LOUIS FISCHER, M.D., Attending Physician to the Willard Parker and Riverside Hospitals, New York City; Attending Pediatricist to the Sydenham Hospital, etc. Fourth edition. With 308 illustrations, several in colors and 30 full page half tone and color plates. Pp. 980. Philadelphia: F. A. Davis Company, 1911.

To have arrived at a fourth edition is in itself enough for any book to claim for itself usefulness and popularity which in no small measure have been accorded to this work of Dr. Fischer. The present edition is a large book and quite encyclopedic in its scope although the number of its pages is less than a thousand. It is plain to be seen that a great deal of hard and earnest work has been expended upon it before it reached its present state of perfection. It is profusely illustrated with many original illustrations and for these alone the book is worth buying and studying. The chapters on infectious and especially contagious diseases are especially noteworthy. Dr. Fischer's experience at the Willard Parker Hospital has fitted him peculiarly for this section of the book. Perhaps nowhere else have we seen so much space given to diphtheria and intubation. A convenient chapter on local remedies, prescriptions and dosage is appended.

# ARCHIVES OF PEDIATRICS

JUNE, 1912.

ROYAL STORRS HAYNES, PH.B. M.D.,  
EDITOR.

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## EDITORIAL.

### TWO PRESIDENTIAL ADDRESSES.

That this is, indeed, the century of the child has been before the subject of ARCHIVES editorials. That the subject is of perennial interest, and of an interest which is constantly growing larger and embracing more and more individuals and classes of individuals, has been evidenced within the month by the delivery of two remarkable presidential addresses. One of these, that of Dr. Carr before the American Pediatric Society, at the annual meeting in Hot Springs, we are privileged to present to the readers of the ARCHIVES; the other, that of Dr. Jacobi, in his inaugural before the American Medical Association at Atlantic



City, all of the ARCHIVES readers will, we trust, soon read elsewhere.

We cannot hope, even, to abstract Dr. Jacobi's earnest and convincing plea for the saving of the babies, nor would we wish to deprive anyone of the pleasure of getting it first hand. Suffice it to say that the ARCHIVES is most heartily in sympathy with what this wise and great pediatricist has said of the need of insuring the birth of infants with improved resistance, of eliminating the high percentage of deaths from congenital troubles, especially of encouraging breast feeding. For safety, for digestibility, for protection against infectious disease and the conferring of artificial immunity, nothing else can approach breast milk, and Dr. Jacobi speaks frankly and vigorously upon this subject. It is his belief that more mothers than do can nurse their babies, and that more women of this generation are doing so than did in the last. He does not believe in overworking a breast because a two-hour interval is the custom, nor in helplessly giving over a child to artificial feeding because a mother seems unable to nurse. Dr. Jacobi's plea that the midwives should be trained and beneficently supervised seems a very much more economical procedure than to abolish them, and the need for betterment of midwifery is clearly imperative. He believes that the field for the midwife cannot be abolished; that in some things she is superior to the obstetrician; and that if she is educated in the care of expectant women, the conduct of normal labor, the care of babies immediately after birth, the simple principles of infant feeding, and the diagnosis of abnormalities so that she can call in help, a great advance will be made against the mortality of early infancy. These are the subjects which Dr. Jacobi deems—and rightly—worthy of the most conspicuous medical address of the year.

The American Pediatric Society has held its position as leader in pediatric subjects for many years, and at its scientific sessions have been presented the advance work in the realm of the illnesses and the care of children. It is significant, when the presi-

dent of such an organization recommends so emphatically that it enter more definitely the many social activities which have grown up in alliance with pediatrics, that the time has come when everyone must realize that the hope for the future of the race, as of the commonwealth, lies in the child and that only in so far as social effort turns the current of events for the betterment of the children can its result be lasting or efficient. We welcome the recognition of this by so eminent a pediatricist and by the Society he represents.

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### "SWAT THAT FLY!"

ARCHIVES readers need no reminder that the above is the indicated treatment for every one of these million-eyed, sponge-footed prowlers, who (to paraphrase the revered author of "The Complaint")

"Swift on his downy pinion flies from filth  
And leaves on bread the germs of diarrhea."

But every ARCHIVES reader may not know in detail what is being done throughout the country in the campaign to clean up and get rid of this very dangerous enemy of mankind. He should look up the reports of the fight against the fly inaugurated by Dr. Hodge in Worcester, where the children were enlisted and prizes given for the most flies killed; he should read of how the Boy Scouts were employed in Kansas and proved the wisdom of their organization in a warfare against a greater danger than the armies of foreign nations. All this is detailed in *The Fly Fighter*, the official organ of the Fly Fighting Committee of the American Civic Association,\* which has other publications on this important subject that may with benefit be consulted by anyone (and this should mean everybody) who wishes to start a housecleaning in his own town.

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\* The chairman of the above committee is Mr. Edward Hatch, Jr., 156 Fifth Avenue, New York C'ty, who will be glad to have those interested write to him.

## ORIGINAL COMMUNICATIONS.

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### THE RELATION OF THE AMERICAN PEDIATRIC SOCIETY TO THE REDUCTION OF MORTALITY IN INFANCY AND CHILDHOOD.\*

BY WALTER LESTER CARR, M.D.,  
New York City.

I appreciate the honor you have conferred upon me by electing me to the presidency, as successor to men recognized in the medical profession as leaders in pediatrics.

So many illustrious names are on our rolls that the mention of some of them without giving all would seem an invidious comparison, and it will suffice to state that a list of ex-presidents that contains the names of the late J. Lewis Smith, Joseph O'Dwyer, William S. Christopher and John M. Keating must indicate a society that has set for itself high standards in the forward march of scientific medicine. It is to one part of this advance that I ask your attention briefly so that we may better understand influences that are correlated with the work of this Society and which must inevitably affect its future. I refer to the efforts that are being made to lessen disease and mortality and to improve the physical foundation of infants and children.

The word conservation may be over-used, but it has an aptness of expression that brings to our minds the improved conditions that prevail in an awakened public sentiment regarding natural resources and an appreciation of the value of health and life.

In our endeavor to save human life we are in a position where as the foremost society for the study of disease in children in this country we must know pathologic discoveries and also, if we are to be ranked among the pathfinders, have a seeing eye for causative factors of heredity and environment that predispose to the pathologic processes that we are met here to study. These causative factors have never been ignored entirely, but in looking over the Index of the Transactions of this Society it is easy to note the changed point of view of the profes-

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\* Presidential Address before the Annual Meeting of the American Pediatric Society, Hot Springs, Va., May 29, 1912.

sion as evidenced by the titles of the papers presented in recent years. Now the topics concern nutrition and problems in metabolism, while formerly the subjects were more often of clinical and pathological interest.

Since its organization in 1888 many influences that have been felt by our Society, and similar medical bodies, have been outside of our direct sphere of activity. Some of these influences have made a change in our attitude regarding disease and we have assimilated them as part of the science of medicine. The lasting fame of Pasteur rests on such influence as to the cause of disease, translated into every-day medical practice. Other influences have exerted pressure upon us, but we could not measure their power and, because of the limitation imposed upon us by our constitution, we have felt it beyond our sphere to discuss biology, heredity, hygiene and pedagogics.

Pressure, such as I have indicated, has come from discoveries made in all branches of science and also from an understanding of the value of these discoveries by people not in medicine, who in association with medical men have taken up some of the problems regarded formerly as the sphere of the doctor. Physicians have occupied themselves with actual disease and its treatment and have not ventured, except in rare instances, into the larger field of prevention.

Latterly, however, popular knowledge of science and medicine has led to the formation of societies with membership lists of physicians and laymen who have coöperated for the public good along educational lines. One such society, the aim of which has been not only medical but also progressive and educational, has brought to discussion the views of clinicians and sanitarians and by the publicity given to its meetings and publications has aroused popular sentiment and affected many reforms.

In another society physicians have associated themselves with tenement visitors, statisticians, and trained nurses to lessen the death-rate in infancy.

Both of these organizations have had a decided influence in lowering mortality and through their propaganda have acted as conservators of life and health. Boards of health and milk commissions have enlarged the sphere of preventive medicine and their efforts have been reflected in our society more largely perhaps than in any society of similar character.

Reference is made to these efforts for conservation to show



how far the public has advanced in its education and not to revert to the fact that by increasing knowledge that can be understood by intelligent people we give to them the power to combat disease and an understanding of the influence of heredity, environment, infection and lowered resistance. This broadened information, through the instruction and advice of the medical profession, has curtailed the discussion of etiological factors in this society. It is not that we have destroyed disease nor have we so mastered its symptoms that there are not problems before us to be solved, but what we have done is to spread broadcast a knowledge of the influence of bad milk, of bacteria as a source of intestinal disease, of the disturbances of nutrition as affecting growth and development and of the danger of infection. Making, as we have, in common with other societies, a study of the origin of disease we, as pediatricians dealing directly with the formative period of life, have, without intent on our part, limited our activity along special lines of scientific work because, for a time, we seem to have settled some important problems, so far as concerns their medical side, and we have relegated many topics to semi-medical organizations, over which we exert only indirect control. This is the position we occupy in the broad problem of conservation of infant life.

If we have shifted our responsibility it is still the duty of this society to keep in touch with all social and economic problems that have to do with the physical foundation of the human offspring. In studying so complex a fabric as the growth of the child, the supervision given by the parents and teachers is not enough to determine its limits of strength and energy. It is not for us to usurp the rights of those who are the natural guardians of childhood, but it is our duty to act as judges and advisors and we can aid in the care of children, who, through no fault of their own, are deprived of the guidance of those who should be their protectors. Infant mortality, child labor, and physical betterment, although interwoven with economic problems, confront us and they become more and more important with a lowered birth-rate, as it is an essential requirement that the surviving members of the race should be endowed with the highest potential efficiency to improve their physical standards and to build upon them a more controlled and stable human machine.

Although there are many aspects of these problems that cannot be made part of the regular program of our meetings,

we have a responsibility that our organization cannot pass on to those whose knowledge is less definite than ours, nor can we in justice to ourselves and to the community relegate the topics to other societies without giving them our expert advice.

In reply to a circular letter sent by your president to sixty-six members of the society, forty-one members answered. Two of the forty-one indicated that they are not affiliated with any organization or movement for improving the conditions of early life. Of the thirty-nine who are associated with these endeavors many are interested in two or more societies. The answers received show the following: thirty-nine are members of societies for lessening infant mortality; twenty-six are members of milk commissions; fifteen are members of societies for the study and prevention of tuberculosis; six are members of societies for the prevention of venereal diseases; six are physicians to orphan asylums; five are connected with school and college athletic associations; five have to do with schools and school hygiene; four are members of societies for the prevention of cruelty to children; four are connected in some advisory capacity with boards of health; four are interested in playground association; three are members of kindergarten associations; two are members of societies that have to do with child labor laws; one is a member of a society for the prevention of ophthalmia; one is a member of a children's aid society; one is connected with a children's court; seven are connected with similar organizations that are not classified. Our society through its members is influential, but this is personal and does not represent us officially.

For a better understanding of what is being done to reduce infant mortality, it may be stated that the results of efforts made for child conservation are felt all over the world. In most European countries during the first five years of the twentieth century the nursling mortality was from 5 to 10 per cent. less than in the previous five year period. Allowing, as we must, for a falling birth-rate—for example, in Paris from 29 per thousand in 1890 to 24.2 per thousand in 1909—the mortality in infants shows a reduction in the recorded deaths and is evidence of greater care in the handling of the newly-born.

These efforts toward conserving child life are not confined to Great Britain and to Continental Europe, but have extended to the tropics and also to the Canal Zone, where by the care exercised in medical and sanitary matters, there were only eight

deaths in 115 cases of enterocolitis admitted to the hospital between January 1, 1906, and March 1, 1911.

Through the assistance of Dr. W. H. Guilfooy, registrar of the Department of Health of the City of New York, I am able to give the mortality record of the city as follows:

Deaths and rates per 1,000 children living under one year of age, comprising the years since the formation of the greater City of New York.

YEAR.	DEATHS.	RATE.
1898	16,070	203
1899	15,381	182
1900	16,640	192
1901	15,467	173
1902	15,526	168
1903	14,413	151
1904	16,125	164
1905	16,522	163
1906	17,188	164
1907	17,437	160
1908	16,231	144
1909	15,976	137
1910	16,212	134
1911	15,030	120

If we compare the rate of 1898 with that of 1911, we will obtain a decrease of slightly over 40 per cent. If we compare the rate of 351 per 1,000 for the months of July, August and September of the year 1898 with the rate of 145 per 1,000 of the corresponding months of the year 1911, we find a decrease of almost 60 per cent.

In order to eliminate the effect of an unfair comparison of a light year with a heavy year as to mortality, let us combine the five years 1890 to 1894 inclusive and compare the average mortality from certain causes of those years with that of the average mortality of the five years 1907 to 1911 inclusive, with the following results:

Taking first the group of contagious diseases, measles, scarlet fever, whooping-cough and diphtheria, the average mortality per 1,000 in the quinquennium first mentioned was 13.19 against 6.10 in the last quinquennium, a decrease of 54 per cent.

The tuberculous diseases, exclusive of pulmonary tuber-

culosis, average 7.57 per 1,000 in the first quinquennium against 2.19 in the last quinquennium, a decrease of 71 per cent.

Simple meningitis showed a decrease of 76 per cent.; convulsions a decrease of 68 per cent.

The three great groups of diseases affecting infant mortality are the acute respiratory, the diarrheal and the congenital. A comparison of the acute respiratory, that is, acute bronchitis, broncho-pneumonia and lobar pneumonia, shows a drop from 42.83 per 1,000 infants to 29.02, a decrease of 32 per cent. All diarrheal diseases combined show a decrease from 67.58 to 38.37, a decrease of 43 per cent. The congenital diseases, including malformations, premature births, preternatural births, inanition, marasmus and congenital debility, showed a decrease from 60.97 per 1,000 to 51.74, a reduction of 15 per cent.

The mortality from all causes decreased from 229.46 to 146.25 per 1,000 infants, a decrease of 36 per cent.

The only cause which showed an increase was that of syphilis, which increased from 1.73 to 2.25 per 1,000 infants, an increase of 30 per cent.

One group of disease, the diarrheal showed a higher decrease per cent. in the mortality than either of the other two prominent groups, and would warrant the conclusion that the work of the Department of Health in the supervision of the milk supply and the establishment of milk booths has contributed largely to this result. We must take into consideration all the other factors that have had a bearing upon the reduction of infant mortality, the work of the philanthropic societies of the city, the education of the mothers as to the feeding of infants, establishment of parks, etc.

We take into consideration also that the mortality percentage of different years is subject to an up-and-down curve that is incident to all statistics bearing on the death rate, and that the year 1911 was remarkable as a "light year," during the summer months. With due allowance for this variation in the death rate, we may, I believe, see some results of the discussions of our society in the improvement in mortality quoted above. We cannot claim all that is good in the lowered mortality rate recorded, because many causes of a lowered mortality were not discussed by us, but other topics incident to it were worked out in our meetings after prolonged deliberations. We took laboratory reports of bacteriologists and of physiologic experimentors,



and checked them off with clinical observations, and our conclusions were given to the medical profession, and through them to the general public. By a constant repetition as we elaborated for our own benefit some of these problems, we impressed physicians and laity with the fact that prevention of disease is possible, and a study of cause is better than treatment of effect. Although we had held nominally to this belief, it was not reiterated emphatically as coming from pediatric authority, and it seemed to require a worldwide movement outside of the medical profession and societies like our own to bring about an effort to save infant life and to develop the best results from our knowledge.

Three things, I believe, are essential to the future of this society to insure its vitality and usefulness:

First, to add to our study of diseases observed in infancy and childhood from the standpoint of their pathological and clinical histories, comparative and tabulated records and methods of precision, so we may judge more accurately of the semeiology of disease. Our collective investigations on scurvy and epidemic poliomyelitis could be extended to other topics, bearing always in mind that every scientific topic is subject to review, and there is none immutable and fixed.

Second, a program on matters relating to metabolic processes, more especially to those of infancy and early childhood, arranged so that investigators will present to this society for its discussion the results of laboratory investigations that bear on our clinical studies.

To this suggestion for the future activities of this medical body, it seems to me we should give much thought. Metabolism comprises so many processes in the development of the body and it points to so many fundamental physiologic facts that we are at times overwhelmed. From the nature of investigations made necessary along the lines of development and physiologic growth, the laboratory offers the best field for experimental study and the pure clinician should await the deductions of the members of this society who are laboratory investigators. Some of the results, however, are valuable clinically and agree with observations that have been recorded by physicians outside the laboratory. Salle, in laboratory experiments, has shown the influence of heat on young dogs and the results of his experiments have accorded with the tables made by Seibert and others, giving the

incidence of digestive disturbance in infants during the heat of summer. Many experiments on metabolism are as yet of limited value because they are links of an incomplete chain, the strength of which we cannot judge until it is fully forged, but as West said in 1847, "the child's body is daily undergoing modifications to fit it for new duties as well as daily growing in size and strength," and we want the aid of deductions from laboratory investigations to enlighten us in preparing the child for its future.

Third, an endorsement of movements having to do with physiologic and economic problems relating to infancy and childhood, particularly those of mortality and disease, in which efforts so many of our members are personally interested. Congenital diseases are among those that may be brought under this class. Dr. Josephine Baker, of the Department of Health, New York City, states a way must be found to diminish the mortality from congenital debility. In this and along other paths that lead to a greater strength for the child and the race, I feel sure that we can work without changing the character of our organization or lessening the value of its meetings.

This society is recognized among the individual members of the societies whose purpose has been indicated above. We can widen our sphere of influence by having representatives appointed to affiliate with organizations having to do with the physical betterment of the child. Advised by the council, such representatives from this society would confer on problems of social, economic and pedagogic importance and would be ready to present information of the physical needs of the growing child and the dangers of pathologic influences.

The American Pediatric Society cannot stand as the highest pediatric body in this country if it fails to recognize the many influences that are laboring both on this continent and in Europe to lower the mortality of infancy and childhood; nor can its opinions be made authoritative unless it acts officially to co-operate with other agencies that are attempting to bring mortality and morbidity under control.

"Pediatrics is preventive medicine of the highest order, and is only possible because of the existence of the developmental period of human life, and because this development can be acted upon, and acted upon strongly by environment, either advantageously or disadvantageously."\*

If we believe this we cannot, as a scientific body, neglect our

opportunities, and we should be ready to give hearty aid and approval to those societies that approach pediatrics from stand-points other than medical.

68 West 51st Street.

ANAPHYLAXIS FOR COW'S MILK IN NURSINGS.—Barbier (*Arch. de Méd. des Enf.*, July, 1910) says that when an infant is breast-fed he takes in a homologous albumin, but when he takes cow's milk he ingests a heterologous albumin. This is poorly assimilated, and only after transformation. Entering the blood it may produce the same phenomena as the introduction of a foreign serum. The pancreas and liver transform albumins. If they are insufficient the milk albumin passes into the blood, as has been proved clinically, and causes the usual reaction of anaphylaxis. In some cases a febrile reaction has been observed in children after taking cow's milk, and a leukocytosis not seen under breast-feeding. In some infants also there is marked intolerance for cow's milk. This is observed after some days of water diet or abstinence from milk, and its resumption must be begun with great care. This is especially true in convalescence from dyspepsias and enteritis. These accidents of anaphylaxis are observed mostly in nurslings who are fed on the bottle, and the milk of asses is better borne than that of the cow. If the dose of cow's milk be continued or increased, symptoms of general intoxication occur. Three illustrative cases are given by the author. The improvement in these cases is immediate when the kind of milk is changed. When, after a few months, an attempt is again made to use cow's milk the same result is obtained. Some infants are intolerant from birth for cow's milk; they have a congenital anaphylaxis for it. This is found in the weak, the premature, the heredosyphilitic, the heredituberculous, etc. Acquired anaphylaxis is apt to arise in children who have been overfed with milk, and is shown by digestive intolerance. Anaphylaxis is generally preceded by dyspeptic symptoms. This condition explains the extreme difficulty of feeding premature infants on cow's milk. There can be no greater mistake in such cases than to persist in the use of such milk. If possible the child should be returned to the breast. After five or six months of age malted gruels may be used or soups made without milk.—*American Journal of Obstetrics.*

\* Christopher, "The Keynote of Pediatrics," Presidential Address, before the American Pediatric Society, 1902.



# A BRIEF STATEMENT CONCERNING THE AGENTS CAUSING MEASLES AND SCARLET FEVER.\*

BY WILLIAM H. PARK, M.D.  
New York City.

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## MEASLES.

The microscopic examination of the blood, tissues and fluids of the body has revealed no microörganism which can be considered of etiologic importance.

*Inoculation in Man.*—Franz Mayr, in Vienna, in 1848, and others about the same time, inoculated healthy children as in vaccination with a drop of blood taken by puncturing the skin during the period of outbreak of the rash and found measles to follow. In vaccinated children who had recovered from measles no infection took place. There was no local reaction. He also collected nasal mucus from a case and placed it upon the nasal mucous membrane of two healthy children. One showed catarrhal symptoms on the eighth day and the other on the ninth day, and both showed a typical exanthem on the evening of the thirteenth day. Those children did not contract the disease when exposed two years later.

In 1905, Hektoen drew blood at the thirtieth hour after the development of the rash, and inoculated a young man successfully. The skin desquamation if infectious at all is certainly much less so than the mucus. Mayr failed with it in human tests and Anderson in monkeys.

Numerous investigators have tried to infect monkeys, but with only occasional success, until the recent thorough work of Anderson and Goldberger, which was afterward confirmed by Hektoen. They found the virus much less infectious for monkeys than for man. The blood carries the virus for a period from at least as early as the development of the rash, to at least forty-eight hours afterward. The same is true for the secretions of the nasopharynx. After that period it is not infectious for monkeys. This coincides with the opinion of many, that measles is not communicable after the temperature has fallen to normal.

The virus is filterable through a Berkefeld filter, resists desiccation for twenty-four hours and is destroyed by heat when exposed to 55°C. for fifteen minutes. Immunity is acquired by monkeys which have passed through the disease.

The complicating bronchitis, bronchopneumonia and coryza are probably caused by the bacteria, common to the respiratory

\* Read before the New York Academy of Medicine, Section on Pediatrics, April, 1912.



tract, engrafted on to the earlier slight inflammation due to the virus of measles.

#### SCARLET FEVER.

The virus is as yet undetermined. It is capable of transmitting the disease in apes and possibly in the lower monkeys. \*Landsteiner and Levaditi have very recently produced in a young orang-outang characteristic scarlet fever by the combined inoculation of the tonsils and subcutaneous tissues.

They had previously produced less characteristic attacks in other varieties of the higher apes. The young male orang-outang was injected subcutaneously with 10 c.c. non-defibrinated blood of a child suffering from scarlet fever. At the same time the animal's throat was swabbed with deposit from the tonsils. Within four days there developed reddening of the tongue and throat. Two days later the temperature rose from 37.5° to 39.5° C., and a slight erythema appeared on the skin of chest and abdomen, hardly enough to call it a true scarlatinal rash. The temperature remained up for two days, then became normal and the animal appeared well.

Nineteen days after inoculation desquamation began on the chest, extended to the abdomen and the thighs, and a little later on the hands and feet. Here the skin peeled off in large flakes. The animal died two months later from miliary tuberculosis. For a time albuminuria was present, 1.2 gram albumin to the liter of urine. This cleared up before death, so that it was probably due to the scarlet fever and not to the tuberculosis.

Bacteriologic examinations of the skin were negative. Histologically, bits of skin excised nine days after the onset of desquamation showed lesions resembling those in human scarlatina: round-cell infiltration and polynuclear leukocyte masses around the vessel walls, leukocyte infiltration in the epidermis and polymorphonuclear deposits under the corneal layer. They failed to produce scarlatina in a large number of trials in the lower monkeys. This is similar to our own negative experience, when a year ago we injected subcutaneously each of six monkeys with 10 c.cm. of blood; each received blood from a different case of scarlet fever. Bernhardt and Cantacuzene think that they have succeeded in producing the disease in the lower monkeys. The former believes he produced the disease with heart's blood, crushed tissue of lymph gland, blood and throat exudate.

The nature of the virus—most stress has been laid upon a strep-

\* Comptes Rendus Heb. des Seances de la Societe de Biologie, Vol. LXXII., No. 9, p. 358, 1912.

tococcus or a diplococcus. Mallory suggested a protozoan. The streptococcus is probably the only organism of those suggested that should be seriously considered. Streptococci are undoubtedly present in the throat in great numbers in every case of scarlet fever. They are present to some extent in the blood of all severe cases and in that of many less severe. Milk from infected cows abounding in streptococci has caused a disease hard to separate from scarlet fever. I have personally investigated a small epidemic, where the milk of a septic cow containing great numbers of streptococci produced a disease in some 30 boys resembling scarlet fever.

Gabritchewsky and other Russians and two Americans believe they have produced immunity by streptococcus vaccines.

In opposition to the claims for the streptococcus we have the fact that streptococci are regularly present in the throat and that the condition of the mucous membranes in scarlet fever is extremely favorable for its development. In our experience the streptococci found in scarlet fever have no distinctive characteristics separating them from those found in other infections. We examined cultures from many cases taken from glands, the heart's blood and from throats.

Kolmer was unable to find streptococcus antibodies in more than 11 per cent. of scarlatinal convalescents. Landsteiner and Levaditi were able to reinfect with streptococci the tonsils in apes immune to scarlet fever. This would be difficult to understand if they caused the disease.

Bernhardt believes he produced scarlet fever with a streptococcus-free material from the third animal of a passage series in lower monkeys.

Hektoen, Landsteiner, Levaditi, Bernhardt, Kolmer, Karl and Jessie Koessler, and most others who have recently approached the problems from the experimental side, believe that the streptococcus is a secondary invader and that the scarlet fever virus, like that of measles and typhus fever, is an unknown agent. Mallory's bodies have too little evidence in their favor to be considered as the causative agent.

Bernhardt recently described small inclusions which looked like trachoma bodies, but these, like those described by Döhle, to be demonstrated this evening by Dr. Nicoll, are of interest from the diagnostic standpoint rather than the etiologic. (See May ARCHIVES, p. 350, and June ARCHIVES, p. 416.)

# INCLUSION BODIES IN SCARLET FEVER BLOOD AS A MEANS OF DIFFERENTIAL DIAGNOSIS.\*

BY MATTHIAS NICOLI, JR., M.D.,  
New York.

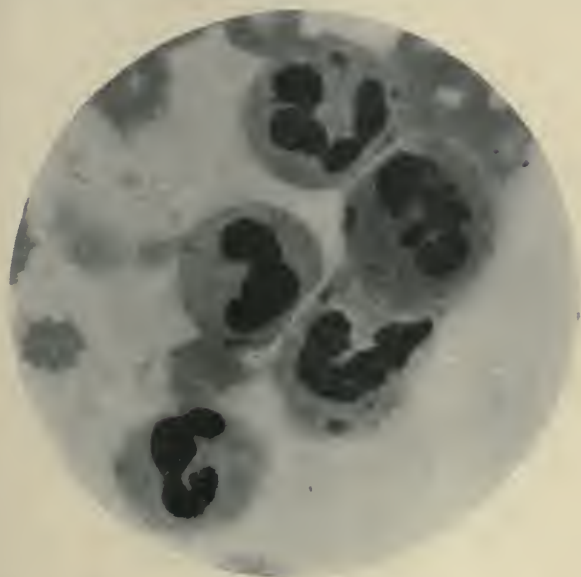
(From the Research Laboratory, Department of Health, New York.)

In the *Centralblatt für Bakteriologie* of November, 1911, Professor Döhle, of the Institute of Pathology of Kiel, reported that he had found in the blood of some 30 cases of scarlet fever which had been sent to him certain inclusion bodies, mainly in the polymorphonuclear leukocytes which, to his knowledge, had not been previously described. In a large number of controls, the nature of which was not stated, he found similar bodies only in a case of pneumonia, which may, however, have been mislabelled, and in 2 cases of carcinoma, in one of which they were not typical, the second case was also a leucæmic. Dr. Martin Kretschmer, of Strassburg, reported, in the *Berliner Klinische Wochenschrift* of March 11th, that he had been able to confirm these observations after examining an equal number of scarlet fever cases. He also examined 70 controls, among which were 20 normal bloods, together with cases of measles, diphtheria, tuberculosis and syphilis. The bodies were found in 1 case of pneumonia with abscess of the neck, in 2 cases of empyema of streptococcus origin following diphtheria, and in 1 of 9 cases of tuberculosis. He was not able to find them in 6 cases of carcinoma, or in an equal number of syphilitic cases. He suggests the possibility of streptococcus infection being the cause of these bodies. Neither of these writers was able to find the bodies in animals before or after inoculation with scarlet fever blood. In April, in collaboration with Dr. Anna W. Williams, I presented to the Pediatric Section of the Academy of Medicine, the results of work performed at the Research Laboratory of the Department of Health on this subject. This has now been carried further, so that I am able to report the results of examination of some 115 cases of scarlet fever blood, and of about 80 controls. In selecting the latter, little effort has been made to determine the prevalence in general of these bodies, but realizing that, in all probability, they would prove of practical rather than scientific value, blood has been taken, in so far as possible, from such pathologic conditions, as the clinician is frequently required to differentiate from scarlet fever.

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\* Read at the Annual Meeting of the American Pediatric Society, Hot Springs, Va., May 29, 1912.

To those of you who have not seen the reports referred to, I would say that these bodies are readily brought out by a number of stains, of which I may mention those of Giemsa, either used immediately or left over night; of Pappenheim and of Manson (borax, methyl blue). The latter for practical purposes is far superior to the others mentioned and fulfills all requirements of diagnosis. With it the red blood cells take on a bluish green



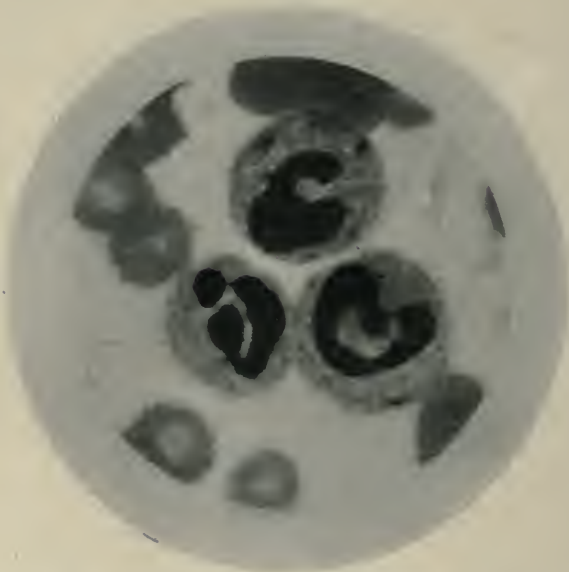
Blood from two cases of scarlet fever taken the fourth day. The inclusions are seen in the leukocytes less deeply stained than the nucleus. (Manson's stain.†)

tinge, the nuclei of the leukocytes a very deep blue, the cytoplasm a very faint blue, and the inclusions a shade somewhat between the two. The latter are of various sizes and shapes; coccus formed, long and narrow masses, and often irregular splashes of blue of large size. In fresh cases of scarlet fever they are found in nearly all the polymorphonuclear cells, varying in number from one to six or more. Contrary to the observations of Kretschmer, a prolongation of the fever and symptoms beyond the usual time is very apt to result in a longer duration of the bodies in the blood, which, in average cases, tend to disappear after the first week of the disease and

† I am indebted to Prof. Francis Carter Wood, of Columbia University, for the excellent photographs herewith reproduced.



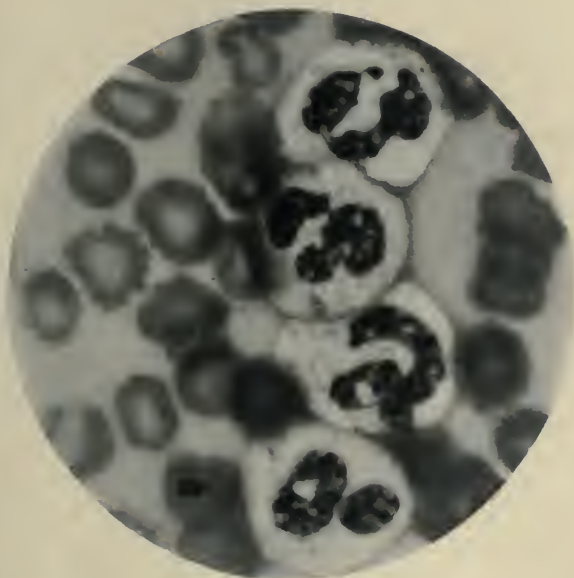
sometimes before. Of the 115 cases, 100 were taken from the scarlet fever wards, the remaining being sent from other hospitals or physicians for differential diagnosis. The great majority of the patients had been ill from one to seven days. They represented all types of the disease, from the very mildest to the most severe. In this series but 16 failed to show the inclusion bodies. One of these had been ill for four days, and although it was sent to the Scarlet Fever Hospital the diagnosis seemed to



Blood from two cases of scarlet fever taken the fourth day. The inclusions are seen in the leukocytes less deeply stained than the nucleus. (Manson's stain.)

me to be by no means certain. Two other cases of five days' duration of undoubted scarlet fever also failed to show the bodies. The other negatives, with one exception, had been ill from seven to twenty-eight days. The exception referred to was that of a child of six who was attacked with a fulminating type of scarlet fever, fortunately very rarely seen; was admitted to the hospital with a temperature of  $106^{\circ}\text{F.}$ , twelve hours after the onset of the disease, and who died twelve hours later, with a temperature of over  $107^{\circ}\text{F.}$  The rash consisted of a dull bluish mottling. The blood showed hardly any leukocytes, and these contained no inclusion bodies.

I have divided the controls for practical reasons into those cases which would not be clinically confused with scarlet fever and those which are frequently so. The bodies were not found in normal blood. In 6 cases of syphilis examined, giving a positive Wasserman reaction, they were found in one, that of a man admitted to the diphtheria hospital with an intensely red throat, cultures from which were negative for diphtheria. He had been luetic for five months only, and the condition of the throat was



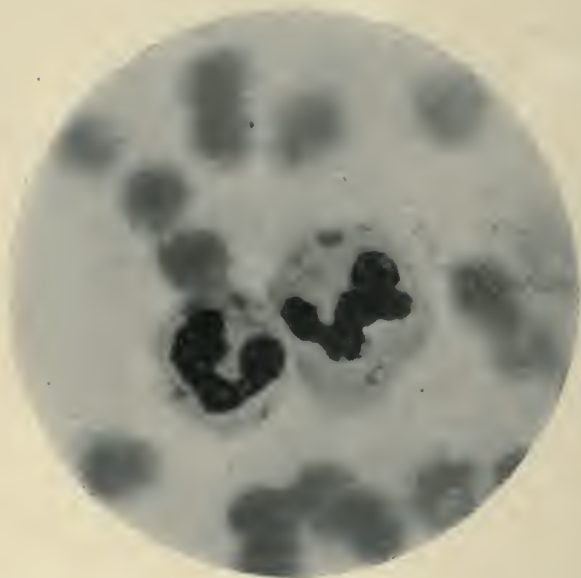
Blood from two cases of scarlet fever taken the fourth day. The inclusions are seen in the leukocytes less deeply stained than the nucleus. (Manson's stain.)

probably due to syphilis and an acute invasion of streptococcus.

Eight cases of erysipelas all showed inclusion bodies. Three cases of diphtheria were negative. Three diphtherias complicated with pneumonia were negative. One case of general lymphatic hypertrophy of unknown origin in a child was negative. One case of varicella was negative. Two cases of uncomplicated whooping-cough were negative. One case of empyema was positive. One case of acute tuberculous pharyngitis was negative. Four cases of typhus fever were positive. Of control cases possible to confuse with scarlet fever, 23 measles proved negative. Seventeen cases of German measles proved

negative. Three follicular tonsillitis, negative. One case of dermatitis exfoliativa negative. Twelve antitoxin rashes of various types all negative. Two cases of rash, probably following intestinal toxemia in infants, negative, while 7 cases of sepsis, most of them of puerperal origin with and without rashes, proved typically positive.

It is to be noted that the number of cases of tonsillitis is too few from which to draw positive conclusions, and as this



Blood from two cases of scarlet fever taken the fourth day. The inclusions are seen in the leukocytes less deeply stained than the nucleus. (Manson's stain.)

condition not infrequently is confused with scarlet fever, especially when the former is accompanied by a rash, a further examination of tonsillitis cases is very desirable. From this series of observations, it is possible to judge of the value, as well as the limitations of this method of diagnosis, and I believe that we are justified in stating that these bodies will be found in every case of scarlet fever with the exception of the fulminating type, who die before the tissues have time to react, up to and including the fourth day of the disease, that they will not be found in antitoxin rashes, measles, German measles, various toxic rashes due to drugs, to intestinal absorption, prob-

ably not in ordinary tonsillitis, but regularly in general sepsis, for which reason, unfortunately, the latter condition so frequently confused with scarlet fever cannot be distinguished from it by the blood examination. During the past month this method of diagnosis has been put to practical use at the hospitals of the Department of Health, as well as among patients of private practitioners who have sent blood for diagnosis, and we have thus been able to make correct diagnosis in serum rashes, mistaken for scarlet fever and the reverse, German measles with scarlatinaform rashes, and various other obscure conditions, and as far as could be determined by the subsequent outcome of the case, the microscopic findings tallied with the clinical course in every instance. In practically all cases sent for purposes of diagnosis, the examiner of the blood smear was unacquainted with the clinical history until after an opinion had been expressed as to whether or not it was scarlet fever.

*Technique.*—For a satisfactory examination of the blood smears, it is quite essential to take a small drop of blood and spread it out evenly and thinly so that the leukocytes will not be distorted or cramped between red blood cells or groups of other polymorphonuclears or pushed or pulled to the edge of the smear, but lie flat and by themselves. The smear is fixed in methyl alcohol, and thoroughly washed, then stained with Manson's stain, for ten seconds to half a minute. Again thoroughly washed and examined with the oil immersion. After a short experience the normal granules of the cell cannot be confused with the bodies under discussion, and not the slightest difficulty is found in recognizing the latter.

In conclusion, it would seem more than probable that the inclusion bodies may be expected to be present in the majority, at least of pathologic conditions, in which pyogenic organisms have produced an acute leukocytosis. In the cases of typhus fever there was a marked leukocytosis, and the throat of the patients were quite as red as those seen in scarlet fever. It would seem that we have in the blood examination of suspected scarlet fever cases an extremely valuable method of differential diagnosis between this disease and nearly all the conditions which resemble it.

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## THE NON-RESIDENTIAL SYSTEM OF CARE FOR CRIPPLED CHILDREN.

BY DOUGLAS C. McMURTRIE,  
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In the non-residential system of care for crippled children there are four essential components—clinical treatment, instruction in day classes, transportation to these classes, and home care.

Clinical treatment is a prime necessity if the physical condition of the children is to be permanently bettered. Fortunately this is available in a greater or less degree of adequacy in most urban communities. It is best, of course, in the clinics of the specialized orthopedic hospitals. Other general hospitals maintain orthopedic clinics on several days of the week and in places where this provision is not possible the children can obtain treatment in the regular course of dispensary work.

Most of the questions affecting clinical treatment are purely orthopedic. There are some phases of the work, however, which have a direct bearing on the social aspect as well. One of the most important of these is the time consumed in securing treatment. A majority of the children must, of necessity, be brought to the clinic by their mothers, many of whom experience difficulty in finding the requisite time. Orthopedic treatment takes longer than routine prescription work in the ordinary medical dispensary, so, owing to this fact, especial care should be taken to eliminate long waits to as great an extent as possible. In some instances a schedule of appointments may be found useful. Such a plan may be valuable in another respect, namely, that it enables the little patients to go to the same physician or clinical assistant each time and so have the advantage of continuity and consistency of treatment.

Where braces are required, the best results are obtained from having a brace shop on the premises. Institutions able to afford it have almost universally made such provision. Other institutions have made arrangements with an existing brace shop under philanthropic auspices to furnish the necessary apparatus. For instance, several hospitals in Brooklyn, N. Y., have their ortho-

pedic appliances made at the shop at St. Mary's Hospital. They are then furnished to the patients at cost.

Where neither of these arrangements is possible the authorities of the clinic should make a definite contract with some commercial brace-maker, thus securing for the patients the benefit of all possible discounts. In no cases should the patients be sent to purchase the apparatus direct. Orthopedics as a business is ridden with the same evils as the other excrescences of professional practice.

In cases where it is possible the patients should pay for the cost of appliances. If practicable, those not able to afford this expense should be given them at less than cost. Several institutions have special surgical appliance funds to meet expense thus incurred.

In a consideration of clinical work there still remains the continuation of the treatment outside the clinic. Most of the patients come to the clinic but seldom. A line of treatment is determined upon, the first step is taken, appliances are prescribed, and the mother or relative who has brought the child is given elementary directions regarding care and the adjustment of braces.

Here is the weakest point in the work of the clinic and gives rise to most of the criticisms directed against it. It is only natural to suppose that any directions so given will not be carried out intelligently by ignorant people. Very often they do exactly the wrong thing. And the supplementary considerations, ventilation, diet and general care, which do so much to help or to hinder progress, cannot be made to count in those families who realize their importance to such a pitifully small extent.

These circumstances lead me to suggest a plan which, to my knowledge, has not been tried in any comprehensive way in any orthopedic clinic. This plan would provide a corps of trained nurses for visiting service. This continuation nursing, as it were, would provide for the intelligent execution of the surgeon's directions. The nurses would be present during the treatment at the clinics and would take the technical orders from the physicians. They would then call at the patients' homes and give first hand instruction in a popular way. They could give such practical suggestions regarding diet as the situation might demand. They could advise regarding ventilation and possibly

arrange for children with tuberculous joints to sleep at a window screened off from the inside of the house by a simple hood. In some instances there might be a chance of the children sleeping on a roof or porch. In any case the trained eyes of the nurses would discover means for improving conditions which would not occur to the uninitiated. There are also many other difficulties which the experience of the district visiting nurses shows can be obviated by such service.

Such a plan has not to my knowledge, I said, been tried by any orthopedic clinic. A modification of it, however, has been in use some time by the Association for the Aid of Crippled Children in New York City, and it is the results of this work which have convinced me of the value of and need for such a system. This organization has maintained a corps of trained nurses who travel daily to and from school with the children under their care. During the remainder of the day the nurses visit in the homes of the children, doing everything in their power to better the lot of their crippled charges. Their work has shown good results.

In many instances they, of course, do far more than supplement the orthopedic treatment. There is often needed help and service outside the pale of hygiene and surgical technique. Here personality counts; and the capable nurse can do much toward the adjustment of strained conditions of any kind.

This work is carried out by an organization distinct from the hospitals and clinics. If such a service were inaugurated as an integral part of the dispensary work there would be, in addition to the advantages already demonstrated, the further advantage of closer coöperation with, and responsibility to, the medical and surgical authorities in charge of the children's physical care.

The transportation of the children to and from day classes is the second essential feature in the non-residential system of care. This may be provided in several ways.

The most obvious and popular mode of transportation is by omnibus. This type of vehicle is in use by the Italian institutions for rachitics, which provide day schools for crippled children, by the organizations transporting children to the special classes maintained by the New York City public school systems, by the Chicago Board of Education, and by the Boston Industrial School

for Crippled and Deformed Children. The conveyances in these instances are simply omnibuses of the familiar type.

A special type of ambulance is in use by the numerous public school boards in England, maintaining special day classes for crippled children—or physically defective children, as they term them. These vehicles are specially built for the purpose. They have space above for stretchers to be slipped in, thus accommo-



FIG. 1.—Ambulance in use for transporting crippled children to the special schools maintained by the London County Council.

dating the most acutely disabled cripples. Below regular seats are provided. The consensus of opinion in the United States is that this mode of transportation is inadvisable, as it savors too much of the hospital and impresses the children with a sense of their own disabilities, a tendency which should be avoided. The practice here regards children too sick for ordinary omnibus transportation as in need of hospital or residential care. The advantage of the system urged by its supporters lies, of course, in enabling the more seriously deformed children to avail themselves of the benefits of education in the day classes.



The size of the vehicles will be determined by the route to be covered and the number of children to be collected. For instance, the Boston institution supplements its regular omnibus service by regular closed carriages which cover the routes on which there live but a few children. This institution also arranges for some of the children, those who are able, to come to school on the street cars, and provides the fare when necessary.

The supervision of the children en route to the classes is considered by many to be of comparatively high importance. Under proper direction the best sort of discipline can be maintained. Without it the behavior of the children can run riot.



FIG. 2.—Omnibus of an auxillary organization transporting crippled children to special classes in the New York public schools.

During the rides there is offered a splendid opportunity for the exertion of a beneficial influence by one who understands the children. The extent to which this may count has been demonstrated by one organization in New York City which has the nurses who care for the children ride in the omnibuses. They thus are brought into intimate daily contact with the children and are able to exert upon the children an influence which is very effective in inculcating good manners and habits of cleanliness and neatness. Such a system also engenders intimate social relations with the children, and the nurse can often furnish encouragement when needed, counteract any attitude of hopelessness, and help to overcome an infinite number of small diffi-

culties which loom large through childish eyes. A carrying-boy also travels in the omnibus of this organization to lift the children in and out.

In New York some transportation is done by the Board of Education. The only attendant, however, is a carrying-boy, who cannot be regarded as a responsible party. The discipline consequently suffers. It would be desirable if some capable woman, not necessarily a trained nurse, could be sent with these omnibuses to exercise a proper supervision of the children. In Chicago a policeman is sent on each omnibus. Though this might work well in some instances, it would seem that, if a salaried escort were to be provided, some more suitable type of person might be found.

In most instances a double trip is made to collect the children. In New York the first round begins shortly after seven-thirty in the morning, the first load of children being deposited at the school at eight-fifteen. The omnibus then starts on its second round and delivers its second consignment of diminutive cripples about nine o'clock. The children then stay in school until two o'clock and two trips are made to return the children to their homes.

In all the transportation systems known to me both boys and girls are taken together. Practically all the provision of this type as yet made is for pre-adolescent children.

The destination of the crippled children is a school where special classes are provided for them. In the classes attached to the public school systems in New York and Chicago the curricula are very similar to those pursued in the ordinary classes of the same grade. Slightly more emphasis than usual is placed on work of constructive character.

The children in such cases should not be forced and the instruction should be so far as possible adapted to the individual disability of the pupils. Frequent recesses should be provided.

The selection of teachers is of the greatest importance. They should be chosen with regard to their adaptability, sympathy and patience. In practically all instances they are given a larger salary than teachers of the same grade who have classes of normal children. The demands upon them are naturally greater.

In New York the teachers of the special classes for crippled children have formed an association for the discussion and study

of the problems involved in their work. Their interchange of experience is of course helpful.

An average schedule for such classes provides for four hours of school work per day instead of the five hour period which prevails in the regular public school classes. This difference in time given to study is, however, compensated by the greater individual attention by the teacher rendered possible by the limited size of the classes. In New York the classes average 17 to a teacher. In the English schools the average number in a class is 21. In comparison to this the ordinary public school class usually has over 50 scholars to every teacher.



FIG. 3.—Adjustable chair and desk in use for the special crippled children's classes in the New York public schools.

Construction details have an important bearing. The best type of schoolroom for crippled children opens out on a court in which the children can play in the open air during the frequent recesses which should be provided. The side of the schoolroom facing this court should be made up of glass doors running from ceiling to floor, and which permit of throwing the side completely open. Such construction provides abundant light and sunshine at all times and all the fresh air which may be desired during clement weather. Rooms should be on the

ground floor of the school building, so as to obviate the necessity for climbing stairs.

Individual lockers should be provided for the children, thus providing a safeguard against the communication of possible infection. A bench or couch should be provided for children needing rest.

The design of the desks is important. The best type I have seen is the one used in the special classes of the New York City public school system. This desk is adjustable in every particular. The top can be set at any angle and pulled over the pupils' laps so as not to require bending over the work. The chairs have two hinged sections which can be adjusted to fit the deformity of either leg. The backs of the chairs can be raised or lowered and set at any desired angle. These adjustments make the desks and chairs adaptable to the individual needs.

It is, of course, impossible for the children to go to their homes at lunch time, so that this meal must be arranged for at the school. There are several plans by which this necessity is met.

In England the school board provides a kitchen with the requisite utensils at the school building and a private philanthropic organization provides the food and the labor for its preparation. This organization endeavors to collect from the parents of the children the actual cost of the daily hot meal thus furnished. In most instances they find this entirely feasible. In Chicago the Board of Education furnishes a hot meal for the children at noon time. In New York various plans are used. The two organizations which provide school buildings and coöperate with the Board of Education which furnishes the teachers and supervises the instruction, provide a regular meal for the children at the building, and the children who are transported to the regular public schools, either by the Board of Education or by an outside philanthropic organization, bring their lunches with them to school. An endeavor is made to have each of the children bring a bottle of milk as part of his or her luncheon.

Where a good hearty meal is provided it, of course, conduces to the physical well-being of the children, in that it provides good nourishment. One organization is opposed to the furnishing of meals to the children, urging that it tends to make the parents dependent on this means of nourishment for the children.



With regard to home conditions: There are two distinct lines of effort. One is to keep the children out of the home as much as possible, providing for them almost entirely at the school. The other is keeping them in school a normal length of time, providing them with as much recreation as possible, and then attempting to improve home conditions through reaching the parents in the proper way. Whatever the actual work done, the attitude of the family must remain of the greatest importance. It has a most direct effect upon the happiness and moral welfare of the children, and if the proper influence is brought to bear conditions may be improved in a permanent way. It must be remembered that the school care will not last forever, and that sooner or later the children will have to go back to more intimate contact and daily relation with their families. If the tendency of their former care has been to estrange them from home influences there will be necessary readjustments which will not be beneficial. If, on the other hand, there has been built up the closest spirit of intelligent coöperation and interest, the children will always have awaiting them homes in which they are sympathetically understood and with which they are intimately acquainted. The position and influence of parents should never be supplanted, no matter what the technical excellence of the care substituted in its place.

Probably the greatest advantage of the non-residential system is that it enables the children to remain with their families, thus maintaining unbroken the home ties.

It must be remembered that the non-residential system is useful only for the children with more or less chronic deformities, which need only occasional care at a clinic. The system is not a substitute in any sense for resident care in a hospital or a home, and must be considered only as supplementary to such work. There are, however, thousands of crippled children in our cities to-day who cannot and will not secure resident care, and who would otherwise be entirely neglected. For such the non-residential system is a great boom, and it is a very favorable sign that our public school systems to-day are coming more and more to realize and assume their responsibilities toward this class of handicapped children.

# REQUISITE STANDARDS FOR RAW MATERIALS IN THE SUCCESSFUL SUBSTITUTE FEEDING OF INFANTS.\*

BY HENRY L. COIT, M.D.,  
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Standards of value, purity and safety for the materials used in the artificial or substitute feeding of infants is a medical question of great importance and, as it relates to milk and milk sugar, it has engaged the close attention of the writer for twenty-four years.

The problems growing out of the relations between the condition of raw food materials and success in their employment are, many of them, yet unsolved. Of these the clinical milk problems are perhaps the most insoluble and the profession is still left in a state of confusion and the authorities in disagreement.

It is my conviction that, with a proper unanimity of purpose, the leaders in the profession would soon leave the present diversity of opinion, the multiplicity of methods, the numberless rules for practice and the sharp controversial attitude of many in the background and the important subject of infant dietetics would be placed on a sound basis.

The universal standard for the food of the young infant is woman's milk and methods for artificial feeding should be determined with this ideal constantly in our minds. It has been too long the rule, when milk used for substitute feeding did not seem to agree after a brief trial or was accompanied by any disturbance, to transfer the infant to materials which represent neither the physiological nor chemical properties of woman's milk.

My experience would indicate that, if the milk is clean, the best way to obtain good results is to continue to work with milk even in the face of apparent failure; that when we follow correct principles and regard the derivatives of milk as a dietetic octave on which we may make as many combinations as a musician with his keyboard, and when we are broad enough, not always to discard the thermic treatment of milk for refining purposes, then uniformly good results are sure to follow the use of milk.

Rules and recommended mixtures have long dominated the medical profession in infant feeding. The infant feeder should seek to know fundamental principles rather than rules and make them his guide in determining his method.

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\* Read before the Annual Meeting of the American Pediatric Society, Lake Mohonk, June 1, 1911.

General rules are unreliable because they cannot be adapted to the variations in individual infants, whereas, by guiding principles, we are enabled to make definite rules for each problem presented.

Principles formulated by the individual worker will lead him to such generalizations as the following: Never use any substance not isomeric with its counterpart in the infant's natural food. Have a valid reason for the use of every element in the food combination. Always determine the probable effect of each substance used on the nutrition of the infant. Milk is the natural food for the feeding of mammals, and since the milks of mammals have the same general composition and physical properties, the milk of one should be available for the nutrition of the young of the other. The basis of an interchange of milks for the young of different species is a synthetic adjustment of the differences in composition yielding a milk approximately that of its own kind.

The lack of definite standards of quality and purity for milk and commercial milk sugar will be conceded by all. There is no uniformity in the character of these materials made of in infant feeding and the lack of general knowledge with reference to their quality and purity explains the apparent failure and early abandonment of both of them so common by physicians.

Milk in its natural condition is free from foreign contamination and is practically sterile, and it should be the supreme effort to realize these conditions to infants fed artificially through clean milk or milk protected from foreign or dangerous contaminations.

Milk is generally accepted to mean one thing, whereas, milk must be considered as a general term. As many different kinds of materials are called milk and lactose (both far removed from ideal conditions of nascent purity) as there are different sources of supply or variations in the practice of cleanliness or varieties of animals yielding these products, or as there are changes caused by all possible sources of contamination—pathogenic, microscopic, macroscopic and chemical—or changes caused by the many kinds of ignorance and neglect in production, transportation or manufacture.

It will probably be true during our life time that if any member of the profession in any community succeeds in obtaining milk of the required clinical standards of purity and equality, he must struggle for several years with professional indifference before

he may inaugurate methods and regulations which will yield what he requires and then he will need to pursue the fight eternally in order to keep what he has attained. The getting of clean milk is a problem requiring unremitting vigilance and a renewal of vigilance twice every twenty-four hours throughout the year.

In his struggle with problems in infant nutrition, it would be far more commendable if the physician would make the necessary sacrifice of time, comfort and money in a campaign to obtain the materials which would fulfil the highest standards of quality and purity than as now so quickly to abandon the logical milk for other substitutes which enable him only imperfectly to put the foundation under human life.

Milk of a suitable quality for successful substitute infant feeding will never be obtained until physicians generally, and pediatricians in particular, realize that they must expend on it more mental energy than is required for the solution of any other problem.

After twenty-four years of effort, I believe it is hopeless to expect to bring milk up to a grade of clinical efficiency by stimulating officers of the law or milk concerns or by demands through the press. The public has no adequate knowledge of this subject, neither has the rank and file of the profession. If milk fit to use for infants or for the sick is ever obtained, we must do the work necessary for its attainment ourselves. It is my opinion that if a dozen physicians in any community would bend their earnest efforts to the work of obtaining clinically clean milk, their labors and example would result in a revolution in milk conditions for that community.

The fixing of definite standards of quality and purity should claim our earnest attention. What these standards shall be remains for the combined judgment of men who have had experience and are thus qualified to determine the range of variations in milk and other materials employed in infant dietetics.

It is quite as essential that standards for raw milk and milk sugar should be fixed for their clinical values as that standards should be required by law in order to market them.

During the past twenty years attempts have been made to standardize many products such as remedial agents, therapeutic serums, antitoxins, chemicals and galenical drugs, and while milk and its chief by-product, milk sugar, should both be standardized as to purity and quality, this has not thus far been accomplished.



We are just beginning to realize the necessity for definite knowledge of our food materials in order to determine their energy equivalents. We have learned how to express the food in percentages and to measure it on a calorimetric basis, but we have not yet simplified these scientific procedures or made them as precise as they should be because we have not fixed uniform standards for the raw materials employed.

We have passed the empirical stage of infant feeding, and what we most need for further progress is food material which represents something exact in quality and purity, and there is no way to properly estimate our results without first knowing what the materials represent in food values and freedom from foreign matter, bacterial and toxic contamination or impurities inimical to infant nutrition.

Nutritive efficiency in milk depends quite as much on freshness and freedom from foreign contaminations as it does on chemical balance or food values. This is abundantly proved by the feeding of infants with contaminated milk, which so often misses the mark, even though it is accurately adjusted and also by direct and successful suckling of goats by human infants, without percentage adjustment. If the claim that quality and purity are important factors in the successful use of milk, then a reference to my own personal experience in artificial feeding would not be presumptuous.

I have had the care of a large number of feeding cases during the past twenty years and have not felt called on to use a patented baby food during this entire period. Without having any prejudice against these substitutes for milk, I have not once been obliged to resort to dextrin, maltose, condensed milk, malt soup, casein milk, buttermilk or dextrine gruels except as starch was designedly added to milk after seven or eight months, and I attribute my results, which have been most gratifying, in a large measure, to my ability to obtain for thousands of private and hospital cases alike, a very clean and fresh milk.

A system under strict medical control whereby clean and uniform milk may be obtained for infant feeding was inaugurated in the United States in 1890 by the Medical Milk Commission.

Through this agency the possibility of obtaining in many cities a clean, raw, clinically safe milk was demonstrated. The Medical Milk Commission has been called the backbone of the pure milk movement. Dairies under its supervision have served as

models for much educational work by the government and one of its most far-reaching results has been its influence on municipal reform for the control of the general milk supply of large cities. The Medical Milk Commissions have done much to establish standards of quality and purity.

The original Medical Milk Commission adopted the following clinical requirements for the "certified milk" produced under its control and supervision:

First: An absence of large numbers of microorganisms and the entire freedom of the milk from the pathogenic varieties.

Second: Unvarying resistance to early fermentative changes in the milk, so that it may be kept under ordinary conditions without extraordinary care.

Third: A uniform nutritive value of known chemical composition and a constant relation between the percentage of the fats, proteins and carbohydrate.

When the Medical Milk Commissions in the United States were federated, an attempt was made to harmonize the requirements of all commissions and officially to fix standards for the milk produced under their control. Each year these standards have been revised and at the present they represent the results of four lines of scientific control touching the hygienic, biologic, veterinary and medical aspects of milk production designed for clinical purposes.

The standards now require the highest type of dairy husbandry, perfect health in the animals, the use of every known precaution to exclude bovine tuberculosis and the practice of dairy hygiene with reference to buildings, premises, utensils and the animals.

The chemical standards require the milk to be free from preservatives, to contain a percentage of fats, in so-called 4 per cent. milk, ranging between 3.5 and 4.5 per cent., or in 5 per cent. milk, ranging between 4.5 and 5.5 per cent., with protein content between 3 and 4 per cent. The test for heated milk is also required.

The bacteriologic standards are also fixed with the laboratory technic prescribed to determine the bacterial content of given samples of milk. The maximum average numerical limit has been fixed at 10,000 per cubic centimeter, with at least a biweekly planting throughout the year.

A standard of safety is also prescribed through medical supervision of all the employees on the dairy as well as of the transfer

agents, with a continual guarantee of their health and personal hygiene.

These standards are far from being comprehensive, and they should be augmented by requirements on the chemical nature of the fats, and requirements on the chemical nature of the protein content of the milk. While a limit of 10,000 bacteria per cubic centimeter is perhaps the best we can hope to attain in the present state of our knowledge of dairy hygiene, yet for clinical efficiency milk should be nearly sterile and we should aim to accomplish this, which is not impossible.

One dairy making certified milk has been able to deliver sterile cow's milk through clean methods several times during the year with an average bacterial count of 400 per cubic centimeter.

There should be a standard of temperature and a standard of freshness which should require a temperature acquired within one hour of milking of 48°F., and maintained within 5° of this point until used. Milk should be not over fifteen hours old when received and not over forty hours old when consumed.

Of the by-products of milk, the most important is milk sugar or lactose, the logical carbohydrate. Many tons of this sugar are employed annually in feeding the American baby. It is far from being an ideal food. It is manufactured in forty-two sugar refineries in the United States. Twenty-five years ago it was made in only one. These refineries are controlled by one holding company. The milk from which the sugar is obtained is of a grade which probably could not be otherwise marketed for food. It is bought for an astonishingly low price and hauled to the refinery where many products are made from it. The first and most important commercially is sizing for wall paper, made from the casein.

The end product is the milk serum or whey which, contaminated with factory dirt and toxins from the myriads of bacteria in the milk, is finally reduced to a semicrystalline magna of crude, impure sugar. This coarse sugar is reduced again by heat and crystallized on cobs. It is of a light brown color, and when ground in a mill constitutes the sugar of milk of the market.

Three years ago I succeeded in persuading the National Milk Sugar Company to refine this market sugar by two or more extra crystallizations in order to remove the gross impurities and the color, and to attenuate the bacterial toxins which the general



chemist of the concern admitted were present. I believe that many of the difficulties of bottle feeding are due to ordinary milk sugar. This belief is borne out by results of using a milk sugar of this extra refined grade with marked absence of clinical difficulties attending the use of ordinary sugar of milk.

The toxins of some of the milk bacteria are heat resistant, notably that of the *enteritidis* of Gaëtner and the *bacillus paratyphosus*, which is responsible for ordinary ptomain poisoning. According to Rosenau the toxins of some of the colon group are also heat resistant and probably account for some of the vomiting, the depression in infants and also for the diuretic effects of milk sugar. Sugar of milk for infant feeding should fulfil higher standards than is now required by the pharmacopeia, which simply calls for freedom from copper, lead, arsenic and other gross contaminations from the vessels used in its manufacture.

Milk sugar for clinical purposes should be made from the whey of fresh and high grade milk.

It seems to me desirable that some representative society of physicians, trained in pediatric practice, should determine the proper clinical standards for milk and milk products. Such society should not only fix these standards, but from time to time should elevate them with the acquisition of more advanced knowledge.

277 Mount Prospect Avenue.

TREATMENT OF HEMOPHILIA.—Schilling (*Münch. Med. Woch.*, October, 1911) relates a single case of favorable result in a boy aged five, whose brother and mother were also bleeders. The degree of hemophilia did not appear to be high. Other members of the family seemed sound. The mother was not an habitual hemophilic, but nearly bled to death on one occasion. The older brother suffered constantly from purpura hemorrhagica. The patient first showed incoercible hemorrhage from the gums. Hemoglobin fell to 25 per cent. Death being impending, direct transfusion was practiced. High fever resulted, but the third day the patient was normal and bleeding had ceased. Bearing in mind the temporary character of the improvement which sometimes results in these cases the author used X-rays every third day over the spleen and long bones, exactly as in the case of a leukemic patient. The hemoglobin went up to 60 per cent. and the blood count also showed a marked regeneration picture.—*Medical Record*.



## NOTES ON THE CARE OF PREMATURE INFANTS.\*

BY ROGER DURHAM, M.D.,

Brooklyn, N. Y.

A child born before the twenty-eighth week of pregnancy can live, at most, a few hours; before the twenty-fourth week may live one to fifteen days; and before the twenty-eighth week usually will die; and later than this with proper care, will survive.<sup>1</sup> In the period, therefore, between the twenty-fourth and twenty-eighth week of pregnancy, the fetus attains a stage in its development when life and growth are possible if the child is born. Toward the end of the sixth month or twenty-fourth week the average weight of the fetus is  $23\frac{1}{2}$  ounces, and its length  $11-13\frac{1}{2}$  inches; its skin has some fat supply; its hair is growing on the head; its eyebrows and eyelashes are present. At the end of the twenty-eighth week the weight is  $41\frac{1}{4}$  ounces— $2\frac{1}{2}$  pounds—and length  $13\frac{3}{4}-15$  inches. The activity in such infants is of necessity very feeble, and very special care is required to raise them. Any child born weighing four pounds or under must be considered to be either premature or congenitally feeble, but the exact determination of its age will be uncertain except in so far as its weight and activity are indications. Especially feeble are the lungs and organs of digestion. The cry is weak and whining; the movements are never vigorous; the muscles of the mouth and tongue may be too weak to nurse, and of deglutition too feeble to swallow. Heat loss is so rapid that it is often impossible to maintain the normal body temperature.<sup>2</sup> The important factors to meet the needs of such infants are, therefore, a supply of proper food; the maintenance of body heat by artificial means; and a sufficient pure air supply for the poorly developed lungs.

In the matter of the food supply it may be stated that it is essential to have breast milk. One has only to remember the difficulties of adapting artificial food to the normal infant during the early weeks of life to realize the practical impossibility of such

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\* Read before the Section on Pediatrics, Medical Society of the County of Kings, January 24, 1912.

adaptation in a premature infant. But the child may be so small as to be unable to nurse on account of physical disproportion, if not of physical weakness; or so weak as to be unable to nurse at all; or the breast milk, as often happens, may be lacking. This latter difficulty may be overcome by obtaining breast milk from the excess supply in a maternity ward, or by taking part of the milk from a wet nurse who is at the same time nursing her own child. Any attempt to obtain a supply by pumping the mother's breast soon fails because of the almost certain cessation of milk secretion in such cases.

In order to maintain proper heat, greatest success may be had with the ordinary homemade padded crib or box, to the four sides of which hot water bags may be hung, with an additional one under the baby if necessary. The sides must not be high enough to exclude air circulation. The baby is placed in this box, after being wrapped in cotton, and the temperature is watched by means of a thermometer placed in the box; 85° or 95° F. may thus be readily maintained as required. The box should be placed in a well-ventilated room or in warm weather may be placed out of doors. This device has been shown by many pediatricists to be far superior to many of the elaborate incubators.<sup>3</sup> The child should not be bathed in a tub, nor exposed to the room temperature any oftener than necessary. Oil or cocoa butter rubs aid in maintaining weight and in cleansing the skin.

Before reporting the history of an unusual case of prematurity, which will perhaps best show the methods used, a few statistics in regard to the subject of premature infants will be of interest.

In 2,314 births in Sloane Maternity Hospital, there were 410 premature babies, of which number 74 were stillborn. There were, therefore, 336 cases suitable for treatment; 85 were treated as infants at term, and 4 died, 145 were wrapped in cotton and not placed in the incubator, and 12 died; 106 were treated in the incubator. Of the latter, 29 died in 4 days (6 being under seven months gestation) and 77 survived the first four days. Of the latter, one-third were known to be living after a period of from three months to three years. Five of these babies weighed less than 3 pounds.<sup>4</sup>

In 1902, in the *British Medical Journal*,<sup>5</sup> is the report of a case of a premature infant that weighed 2 pounds. It was treated in an incubator and lived for ten months and weighed 6

pounds, 12 ounces. It did not survive an attack of bronchopneumonia. In the same journal<sup>a</sup> is published the history of another premature child of 18 ounces (six and one-half months' gestation), treated without incubator but by being wrapped in cotton. This child, though small for its age, was living at the end of twelve years.

The following history is of a child that weighed 1 pound, 12 ounces, at birth, May 8, 1911. The length of gestation cannot be absolutely fixed, but can hardly be more than twenty-six weeks. The mother menstruated twice in the previous November and December, the sixth and fifth month respectively, previous to the child's birth. She felt life first ten weeks before the advent of the child. She had been taking quinine, of her own initiative, for three weeks for chills and fever. The labor was brief, and after a few pains, which the mother did not recognize as labor pains, the child was delivered spontaneously. She then called for medical aid. The child was unusually vigorous, giving out frequent cries, kicking with some energy and having a good color. The appearance was senile, head large, skin wrinkled, eyelids not opened, eyeballs protruding and arms and legs about as large as a medium sized finger. The mouth was so small that it could not grasp the mother's nipples, and the milk supply, which soon became abundant had to be expressed by pump, and fed in a doll's nursing bottle, a dram at a time every hour and a half. The child grew more vigorous from the start in spite of the bad prognosis and gained steadily in weight. She was wrapped in cotton and placed in blankets surrounded by hot water bottles. At the end of two weeks the breast milk failed and the child was taken to the maternity ward of the M. E. Hospital. On admission, she weighed 2 pounds, a gain of 4 ounces, in two weeks. During the first six weeks feedings consisted of breast milk taken from the excess supply of the mothers in the ward, the amount being increased from 3 to 6 drams in that time. At the end of the sixth week the child weighed 2 pounds, 10 ounces, a gain of 10 ounces in four weeks. From the sixth to tenth week she took 4 to 8 drams at each nursing, part breast milk and part 1 to 20 whey mixture every two hours, breast milk being given when the supply was obtainable. From the tenth to fourteenth week 1 and 2 to 20 whey mixture was given exclusively in 1½ to 2 ounce quantities. She then weighed 3 pounds, 8 ounces, a gain of 14 ounces in four weeks. At the end of four

months she weighed 5 pounds, 15 ounces, and alternate feedings of modified milk, a formula suitable for the third month, were given 4 to 5 ounces every three hours. At five and one-half months she weighed  $7\frac{1}{2}$  pounds and was taking 6 ounces of a formula of 9 ounces of 7 per cent. cream and 10 ounces of water.

A comparison at this time with an average child at birth weighing  $7\frac{1}{2}$  pounds showed: length, greater by one inch; circumference of head greater by one and one-half inch, and the chest larger by two and one-half inches. At this time she was taken to her home and continued to be fed on modified milk. At seven months she weighed 9 pounds. At eight months she was to all appearances a perfectly healthy child, fat, stocky, bright, and able to sit with a pillow support and perfectly formed though of small proportions. She gave every hope of growing up well, strong and normal. At this time she contracted bronchopneumonia, weathered a course of ten days with a temperature range of  $103^{\circ}$  to  $105^{\circ}$  F., pulse running above 200, and respirations 80-90. Temperature fell to normal, and the signs began to clear, and it looked as if the impossible had been attained, when the heart became irregular and showed signs of failure, and after two days the child died at the age of eight and one-third months.

No small part in the success in the feeding of this child up to the time she left the hospital is due to the nurse in charge of the ward, who lost no opportunity to obtain the breast milk, and spared no pains in watchfulness over the management of the improvised incubator. The adequate supply of breast milk was undoubtedly the greatest factor in the care and growth of the baby. That she lived twelve days with a bronchopneumonia, testifies to her powers of resistance. I am satisfied that had she survived the pneumonia she would have grown up a normal and not a physically stunted child.

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## MISCELLANEOUS.

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### THIRD INTERNATIONAL CONGRESS FOR THE STUDY AND PREVENTION OF IN- FANT MORTALITY.

BY HENRY L. COIT, M.D.

The report herewith presented is an attempt to give an impression of the above-named important International Congress. Under the high protectorship of Her Majesty, the Empress and Queen, and the patronage of the German Imperial government, the Third International Congress for the Protection of Infant Life was held in Berlin, September 11 to 15, 1911.

The first congress, held in Paris in 1905, was inspired and organized by representatives of the French agencies for the protection of infant life. (*Consultations des Nourissons and des Gouttes de Lait.*) Two years later in Brussels the meeting took on a broader scope for its work, and through a permanent organizing bureau, called "The International Union for the Protection of Child Life," placed the organization of future Congresses in its hands, with its headquarters at Brussels, and Dr. Eugene Lust as Secretary General.

At a meeting of the permanent committee in 1909 Berlin was chosen as the place for holding the third congress. A committee on organization was elected under the presidency of Dr. Bumm, and the vice-presidency of Professors Dietrich and Heubner. The president-elect of the congress, Professor Theodore Escherich, of Vienna, having died, Professor Dietrich, of Berlin, was elected president, with Professor Arthur Keller, of Berlin, as Secretary General.

The third congress convened in the parliament chamber, Reichstag, the government having assigned this capitol building for the general sessions and numerous section meetings. The opening session was honored by the presence of Her Majesty, the Kaiserin, and was presided over by His Excellency, Dr. Von Bethmann-Hollweg, of the Prussian government.

The addresses by the national representatives were delivered mostly in German and French. The only English-speaking delegate recognized at the meeting of inauguration was Sir Arthur Newsholme, head of the British National Bureau of Health. The native delegate for the Chinese Imperial government, Dr. Lim Boon Keng, of Peking, dressed as a European, also spoke in English.

Representatives, either as delegates or members, were present from the Imperial government, most of the large municipalities in the German Empire and the Confederate States, and from foreign countries, as follows: Argentine Republic, Australia, Austria, Belgium, Canada, Chili, China, Cuba, Denmark, Egypt, France, Greece, Great Britain, Hungary, India, Italy, Netherlands, Norway, Portugal, Roumania, Russia, Sweden, Switzerland, Spain, Uruguay and the United States. About seventy-five English-speaking members were present, of which sixty were from Great Britain, prominent among whom were Bailie W. F. Anderson, of Glasgow, President of the British National Association on Infant Mortality, Dr. Arthur Newsholme, of London, and Alderman Benjamin Broadbent, of Huddersfield.

It was unfortunate that our National Association did not take the proper steps to send a representative with governmental appointment to present to this congress the governmental, philanthropic and national organization work in the United States, in which there are so many efficient agencies designed for the protection of infant life. Our president, Professor Charles R. Henderson, was expected to represent these various activities, but was detained in London at the International Prison Congress, and the other members of our association present were not properly delegated.

After the opening session, the members, of whom there were about eight hundred present, met in five sections to present and discuss the work of the congress:—

I. *Teaching and Instruction as it Relates to Physicians, Visitors, Nurses and Social Workers.*

II. *The Work of Protecting Infants by the Employment of Pre-natal, Neo-natal and Post-natal Measures by State and Municipal Help to Mothers and their Children; Encouraging Normal Breast Feeding; the Purity of Infants' Milk; Infants' Welfare Stations for Instruction and Material Assistance.*

III. *Laws and Other Measures of Public Administration Concerning the Protection of Infant Life; To Provide for the Care of Defectives, Illegitimates, Syphilitics, and the Control of the Public Milk Supply.*

IV. *Guardianship as Provided by State Institutions, Hospitals, Orphanages and Country Homes.*

V. *Statistics Dealing with Plans for an International System of Standards for Determining Infant Mortality.*

The Committee on Arrangements presented to each delegate and member an octavo volume in German, French and English, written by the president of the congress, Professor Dietrich, being a description of the hospitals, institutions, and infants' welfare agencies in Greater Berlin, organized and equipped by the government or private philanthropy for the protection of child life. It served as a guide for those who wished to visit these institutions, of which there were fifty in the city.

Among the prominent persons in charge of the section work were Professors Heubner, Baginsky, Biedert and Czerny. Many valuable papers were read before the sections. Among the notable scientific presentations were the following: Prof. Marfan, Paris, "The Teaching of the Pathology of Infancy"; Prof. Medin, Stockholm, "Results of Under-graduate and Post-graduate Instruction of Physicians in the Hygiene of Infancy"; Prof. Langstein, Charlottenburg, "Public Instruction Concerning Nursing and Feeding of Infants"; Prof. Schlossman, Düsseldorf, "Protection of Foundlings and Illegitimate Children"; Prof. Finkelstein, Berlin, "Hospitals, Asylums and Homes for Infants"; Dr. Marie Baum, Düsseldorf, "Care of Infants in the Country"; Dr. Henry Koplik, New York, "The Development of Pediatric Medical Teaching in the United States"; Dr. Charles G. Kerley, New York, "The Training of Nursery Maids." Among the American papers there was one presented by Mr. Nathan Strauss, reporting his philanthropy of distributing modified and Pasteurized milk to the poor. The writer, also, read a short paper on "Standards for Raw Materials in the Substitute Feeding of Infants."

Among the many functions provided for the entertainment of the attending members were a reception by the president at the Prussian House of Commons, reception by the Municipality of Charlottenburg, and a banquet at the Zoological Gardens; visits under the guidance of prominent congress officials to the principal children's hospitals and institutions in Berlin, Charlottenburg and Weisensee, reception of the congress and banquet given by the city of Berlin in the town hall, and a gala performance at the opera, given in honor of the visiting members.

At a meeting of the English and American delegates, in which it developed that because of the prevailing language in which most of the papers were presented, much difficulty had been experienced in getting before the congress an adequate representa-

tion of the work being done in Great Britain and North America on the study and prevention of infant mortality. The writer suggested that in view of these facts it would be practicable to hold an English-speaking conference on infant mortality in London, co-incidental with the International Medical Congress in August, 1913, and expressed the view that since this would occur midway between the present and the next quadrennial meeting of the International Congress on Infant Mortality, that it would not detract from, but fix and increase, the interest of English-speaking countries in the international programme. The plan was well received, and the British National Conference on Infant Mortality has since adopted it, and will endeavor to organize the conference.

On September 14th the sitting of the Permanent Bureau occurred to determine the place of the next congress, to elect officers and new members of the Permanent Committee of the International Union, in the hands of which the organization of the next congress is placed. On the invitation of the Holland Government, it was decided to hold the fourth congress in The Hague in 1915, with the understanding that the fifth would be held in London in 1919. Professor Hector Treub, of Amsterdam, President of the Holland National League for the Protection of Infant Life, was elected President. Dr. Eugene Lust was re-elected Secretary General, with headquarters at Brussels, Belgium. His address is 27 Rue de Limite.

The American delegates present found that the United States would be allowed twenty-five members, and the following persons, including the four previous members, were elected to the Permanent Bureau: Abraham Jacobi, Charles R. Henderson, L. Emmett Holt, John W. Kerr, J. H. Mason Knox, M. J. Rosenau, Henry Koplik, H. J. Gerstenberger, Helen C. Putnam, Cressy L. Wilbur, T. M. Rotch, H. D. Chapin, R. G. Freeman, S. McC. Hamill, L. E. LaFétra, C. G. Kerley, John Howland, F. S. Churchill, Nathan Strauss, G. W. Goler, L. C. Ager and Henry L. Coit.

A very pleasant and memorable occurrence marked the closing session of the congress. A spontaneous outburst of good feeling by the English delegates toward their German neighbors was expressed in a speech of felicitation by Alderman Benjamin Broadbent. This was followed by a cordial response in a kindred spirit by the presiding Prussian prince. It was a fitting ter-



mination to an international meeting having broad humanitarian ideals and purposes, and filled all who heard it with great enthusiasm.

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NEPHRITIS OF CHILDHOOD.—Hutinel (Bull. méd., February 5, 1910) says that in acute scarlatinal nephritis all parts of the kidneys are involved in the inflammatory process, cortex, vessels, and epithelium. It is a pure diffuse nephritis; the vascular alterations are curable, and their predominance explains the good prognosis of this form of nephritis. Parenchymatous nephritis is almost always due to infection; the severity depends on the virulence of the germs and the length of time during which they are active. A short period of active virulence is more easily recovered from than a long period of feeble activity causing renal sclerosis. Exposure to cold is the cause of a more severe infection. It is most important to keep the child from changes of temperature. This form of nephritis rarely becomes chronic. But a sensitiveness on the part of the kidneys may remain for years after it. Prognosis is better in the acutest forms, and when the urine shows less severe lesions. There may be anuria, oliguria, or hematuria. Loss of weight and failure of general nutrition are of bad prognosis. Intermittence is also characteristic of this form of nephritis. Another interesting condition is the latency of these lesions in some cases. Children easily resist severe kidney lesions and recover from conditions that would be fatal in adults. The fresh, new epithelium repairs easily; reaction in the form of vasodilatation occurs, with interstitial edema and anasarca. The treatment consists of water diet for two or three days, with absolute rest in bed. Then milk diet for a certain time, but not so long as to cause anemia. This is followed by a diet containing milk and vegetables, and finally white meats are added in moderate amounts. A diet with very little salt is used in long and obstinate cases. It consists of carbohydrates, fats, and nitrogenous substances in small amounts. The functions of the skin should be stimulated by baths and friction. The mouth, nose and pharynx should be disinfected. In acute conditions with anuria dry cups are valuable, as well as hot packs. Theobromine is a good diuretic. The great dependence should be placed on the milk diet and general hygienic measures.—*American Journal of Obstetrics.*

## SOCIETY REPORTS.

### PROCEEDINGS OF THE TWENTY-FOURTH ANNUAL MEETING OF THE AMERICAN PEDIATRIC SOCIETY.

*Held at Hot Springs, Va., May 29 to 31, 1912.*

The meeting was called to order at 10:30 A.M. by the President, Dr. Walter Lester Carr.

Those present were: Drs. Abt, Acker, Adams, Butterworth, Carr, Carpenter, Churchill, Coit, Eaton, Freeman, Graham, Griffith, Hamill, Hand, Heiman, Holt, Howland, Kerley, Knox, La Fétra, Morse, Nicoll, Southworth, Talbot. Also as guests, Dr. Henry Price, of Pittsburgh; Dr. Thos. C. McCleave, of Berkeley, Cal.; Drs. Henry S. Pole, Edgar A. Pole, Lanier D. Pole, Guy Hinsdale and Frank Hopkins, all of Hot Springs, Va.; Dr. G. Hudson Makuen, of Philadelphia, Pa.; Dr. McGuire Newton, of Richmond, Va.; Dr. H. J. Morgan, of Toledo, O., and Dr. Arthur C. Nason, of Newburyport, Mass.

The Presidential Address, by Dr. Carr, considered the subject  
THE RELATION OF THE AMERICAN PEDIATRIC SOCIETY TO THE  
REDUCTION OF MORTALITY IN INFANCY AND CHILDHOOD.

(The Presidential Address is printed in full on page 404 of this issue.)

DR. JOHN RUHRÄH read a brief report of

AN EPIDEMIC OF SORE THROAT WITH INVOLVEMENT OF THE  
CERVICAL LYMPH NODES.

This epidemic of septic sore throat occurred in Baltimore during February and March of this year.

Epidemics of this disease have been noted abroad, particularly by the English, but severe epidemics have occurred in other places, notably one in Christiania, in 1908. The disease was first reported in America from Boston, where a severe epidemic occurred in 1911. This epidemic was of unusual severity, affected adults, and was finally traced to one of the largest and best controlled dairies supplying milk in and about Boston. Since that time the disease has appeared in several American cities, notably Chicago and Baltimore. The Baltimore epidemic

began in January, increased throughout February, particularly in the third and fourth weeks, and in the first two weeks of March. In February, 92 cases occurred in 35 households. A very large proportion of the cases occurred in families taking milk from one of the largest and best dairies, and after the disease was started it was apparently transmitted directly from one person to another, nurses and other persons closely associated with cases contracting the disease. There were 11 deaths among children and 5 among adults, all the fatal cases but 2 coming from families supplied by a single dairy where pasteurization had been abandoned for a time on account of trouble in the apparatus, and to the continued cool weather. When pasteurization was resumed the epidemic stopped.

Among the fatal cases, 9 were due to peritonitis, 4 to septicemia, 2 to erysipelas and 2 cases cause not stated.

The clinical history of the disease is very striking, and in the Baltimore epidemic most of the cases occurred in children. The attack began with fever and sore throat, and usually more or less severe prostration, and after a day or two there was acute swelling of the cervical lymph nodes; in the average case this persisted from one to three weeks and then gradually disappeared without suppuration. In many cases there was very high fever and often convulsions, and in some there was a general septicemia. In a number of cases there was a peritonitis which always proved fatal. There were numerous complications in almost all of the cases, bronchitis, otitis media, involvement of the accessory sinuses, irregular swellings and edema, abscesses, skin infections and numerous other things were observed. In some cases recovery was remarkable, considering the various complications, and it was noted that four weeks may elapse and still perfect recovery ensue.

The organism causing the disease was easily obtained, either from the pus from the ears or from the throat, or from blood cultures in the cases of septicemia. In the smears the organism appeared as a diplococcus with a distinct capsule. When cultivated it took the form of a streptococcus in short chains, in which the diplococcus arrangement was preserved. Heating milk to 145° kills it. In some cases the pneumococcus was also noted.

DR. HOLT asked how the disease germs got into the milk.

DR. KERLEY cited such a case with enlarged glands and a mild

pneumonia which were followed by a fairly severe peritonitis. To everyone's surprise, the symptoms of peritonitis subsided somewhat. Then an acute nephritis occurred, which subsided. After three weeks the peritonitis lighted up and the child died in the fourth week.

DR. HAMILL brought up the question of the preliminary fall in the number of cases during the first week in March before the definite fall due to the repasteurization of milk.

DR. KNOX said that in the Baltimore epidemic he saw 2 cases of erysipelas of the face and scalp which terminated fatally. In a third case of erysipelas there was no redness, but swollen epaulets appeared on both shoulders; on the second day redness extended down the arm. The child recovered. A boy of five years had a typical severe attack with marked buboes, especially on the right side, double otitis media, fever for three weeks and a question of whether or not there was a complicating peritonitis. His spleen was enlarged, reaching almost to the navel, finally disappearing. The boy returned from Atlantic City in three weeks entirely well, but his ear began to run again. His mother took care of him and developed an infected finger, later sore throat and a septic rash like scarlet fever.

DR. TALBOT thought that these cases in the Boston and Baltimore epidemics were due to mixed infections.

DR. CHURCHILL said that he had seen cases in one family in Chicago, although the family was supposed to use only certified milk. Other cases had been traced to the milk delivered by one delivery company, but not to a single dairy. Some patients had sequelæ of endocarditis as a result of this septic sore throat. In general, the streptococcus was the organism found.

DR. MORSE said that he had seen two epidemics. The 1911 epidemic was very severe. It was traced to a man who had himself had sore throat and had infected the milk. The epidemic of the spring of 1912 was probably not due to the same germ. One of the most striking things which he had noted was the severity of the complications which arose during convalescence, such as the enlargement of the glands, nephritis, etc. General peritonitis when it occurred was almost always fatal whether it was operated on or not. If the enlarged glands suppurated, it was apt to be quite deep.

DR. COIT raised the question whether or not ordinary pas-



teurization would be sufficient to destroy these germs. This was especially important in view of the recent statement of Rosenau, that pasteurization as ordinarily carried out is not effective.

DR. EATON inquired as to the method of treatment that was found to be of avail, especially whether or not autogenous vaccines had been used, and if they had, with what results.

DR. RUHRÄH, in closing the discussion, said that he was unable to say how the germ got into the milk. In the English epidemics there was usually found an abscess or ulcer of the udder or teat. In the Christiania epidemic a particular cow was found from which was isolated a streptococcus identical with that found in the throat. As to the fall in the number of cases before the repasteurization of the milk, this was more apparent than real; there were many cases from February 16th to March 17th and then a sudden fall. The rashes seen were septic and probably not scarlet fever. The identity of the organism was still a matter of doubt. It was not known whether it was the pneumococcus or the streptococcus. Both these organisms were usually found in cultures, but the streptococcus seemed the main infecting organism. A temperature of 54°C. for twenty minutes will kill the organism. No autogenous vaccines were used. The very high temperatures were striking. They did not yield to hydrotherapy, and often lasted for days.

DR. HOWARD CHILDS CARPENTER and DR. J. CLAXTON GITTINGS read a paper on

#### THE COAGULATION TIME OF BLOOD IN INFANTS AND CHILDREN.

Drs. Carpenter and Gittings used the Solis-Cohen modification of Milian's method, and the wire loop method of Biffi. They reported examining 35 healthy children with an average coagulation time of 9.4 minutes with the Biffi-Brooks apparatus, and 125 cases suffering from a variety of diseases with an average coagulation time of 9.7 minutes, showing an unimportant difference between the well and the sick.

Forty-one cases in which the Solis-Cohen apparatus was used gave an average coagulation time of 7.6 minutes.

According to their results there was no noticeable difference between the white and colored races in the early years of life.

In the individual diseases the maximum and minimum figures showed a wide variation. The various diseases showed

average differences which could hardly be considered of any real importance.

DISCUSSION ON DR. CARPENTER'S PAPER.

DR. HAND asked as to the results of the study of cases of diphtheria and pneumonia. The old impression had been that there was a heightened coagulability or an increased plasticity of the blood in pneumonia.

DR. GRIFFITH asked whether anything of value had been learned from a study of the coagulation time as to operation on the throat and nose.

DR. CARPENTER replied that in bronchopneumonia the coagulation time was practically normal, 9.5. In lobar pneumonia there seemed to be a shortened coagulation time. In regard to operations on the nose and throat, no practical conclusion was to be drawn from a study of the coagulation time.

DR. MATTHIAS NICOLL, JR., read a paper on

INCLUSION BODIES IN THE BLOOD OF SCARLET FEVER AS A MEANS OF DIFFERENTIAL DIAGNOSIS.

This paper is printed in full on page 416 of this issue.

DR. KERLEY said, in discussion of Dr. Nicoll's paper, that he had asked Dr. Nicoll to examine the blood in 2 cases in his private practice. One case was reported positive and the other negative. The case which was reported positive desquamated in two weeks; the case reported negative did not desquamate.

DR. HOLT asked how long the bodies last in the blood.

DR. BUTTERWORTH was inclined to be cautious in regard to new bodies lest they be artefacts.

DR. NICOLL replied that he did not know how long the bodies last in the blood. He believes from his experience with them up to date that they are of great value in differentiating German measles from scarlet fever.

DR. J. H. MASON KNOX, JR., and DR. T. P. SPRUNT presented a report of a case of

CONGENITAL OBSTRUCTION OF THE POSTERIOR URETHRA.

The boy, who was five years old, had difficulty in controlling micturition from infancy. Urine was passed every half hour,

day and night, and was attended by no pain. Four weeks before death, there occurred a sudden onset of the terminal illness with cough, abdominal pain, vomiting and constipation. Physical examination showed malnutrition, purulent conjunctivitis, rhinitis, discharge from left ear, tonsillar abscess, protuberant abdomen, a tumor above symphysis with dull percussion note, redundant foreskin with phymosis. Hemoglobin, 70 per cent. There was no fever. Later vomiting became frequent, there were many convulsive attacks and breathing suggestive of air hunger. He was circumcised three weeks before death, with the result of slightly improving the flow of urine. Attempt at catheterization failed.

At autopsy there was found an obstruction in the prostatic portion of the urethra, which was converted into a blind pouch by the fusion of its anterior and posterior walls, due apparently to an over-development of folds normally present immediately distal to the verumontanum. A small triangular opening whose sides measured 3 mm., situated in the floor of this pouch, was the only communication with the anterior urethra, and through this the urine must pass. As a result of the urinary stasis there had occurred marked dilatation and hypertrophy of bladder, ureters and kidney pelves with typical hydronephrosis terminating in uremia.

Aside from the condition in the urethra, no other congenital anomaly was discovered unless the adrenal adenoma may be so considered.

A review of the literature indicates that, although the condition here described is unusual, similar cases have been not infrequently met with. Two principal views have been taken as to the etiology of these cases. One of these is that the condition is due to an over-development of the folds normally present in the mucosa, and that the pressure of the urine exerts a continuous irritation on this region, producing inflammatory changes which further increase the obstruction. Others consider the lesion to be a malformation due to arrested development. Recent studies in embryology throw no definite light on the subject. We lean rather to the view that we are dealing with a simple progressive malformation, and not one due to arrested development. We have been able to find no similar case reported in full in our American literature. The possibility of interference with the urinary flow from such congenital mal-

formation should be considered whenever the cause of the obstruction is not obvious. The condition when recognized should, in most instances, be easily corrected. Autopsy findings should not be considered complete without incision through the anterior urethral wall, and inspection of the complicated structures in the pars prostatica.

DR. GRIFFITH, in connection with this case, reported the case of a child with large abdominal distention which was due to retention of urine.

DR. HENRY HEIMAN, in collaboration with DR. SAMUEL BOOKMAN and DR. BURRILL CROHN, of New York, read a paper on

A STUDY OF THE METABOLISM OF AMAUROTIC FAMILY IDIOCY.

DR. HEIMAN said that despite the fact that valuable information regarding the nature of the disease might be obtained from metabolism studies, the chemical aspect of amaurotic family idiocy has been almost entirely neglected. Mott has shown a relative diminution in nucleo-proteids, and increase of simple proteids in the brain. Recently Brooks and others have found morbid changes in the pancreas, hypophysis, thymus and adrenals. With these findings it might be expected that the metabolic process of the body would show some departure from the normal. Moreover, as a result of the generalized degeneration of nerve tissue constantly taking place in this disease, a disturbance in the excretion of phosphorus and sulphur, which form an integral part of nerve tissue, might be expected. The present study was undertaken in 2 cases of typical amaurotic family idiocy, seven and fifteen months of age respectively. Both cases were at an early stage of the disease. Their general nutrition was good, the muscular tissue being still well preserved, and an abundant panniculus adiposus present. During the period of observation, four days each, a gain of 30 to 180 grams was noted. The diet consisted of undiluted milk in one case, and diluted milk in the other. The caloric intake was in excess of the Heubner figures. The results show that absorption from the gastrointestinal tract and retention within the body was normal, or even better than normal. No marked disturbance in the metabolism of phosphorus and sulphur was present. The general results indicate a hypernormal anabolic function at this



stage of the disease. However, on account of the slowness of the process of degeneration, and the small quantities of phosphorus and sulphur present in the entire cerebrospinal system, it would be advisable to study the chemical aspect of the disease at short intervals during its entire course.

DR. J. P. CROZER GRIFFITH read a paper on

INFANTILE TYPHOID FEVER BASED ON THE ANALYSIS OF 75 CASES  
OF TYPHOID FEVER OCCURRING IN THE FIRST TWO AND A  
HALF YEARS OF LIFE.

Dr. Griffith said in part that the onset of typhoid fever in infancy is of decidedly shorter duration than later, its length averaging perhaps three to four days before evidence of the fully developed attack is present. The attack usually develops rapidly and is often sudden, only about one-third of the cases showing a slower appearance of symptoms. These symptoms consist chiefly of fever, diarrhea, vomiting, prostration, headache, loss of appetite; less often of cough, fretfulness and abdominal pain. The temperature rises rapidly, diarrhea is more common than in childhood, vomiting is a symptom decidedly more frequently seen than later, and loss of appetite is often observed. Prostration is seldom marked. Cough, abdominal pain and distention are infrequent, and epistaxis is rare.

*General Conclusions.*—The fully developed attack of typhoid fever in infancy shows many *digestive symptoms*. Coating of the tongue is of common occurrence; dryness and fissuring are exceptionally rare. Redness and swelling of the throat would probably be found frequently if examinations were systematically made. Decided loss of appetite is uncommon; vomiting is certainly much more common than in early childhood, being seen in decidedly the majority of cases, but is seldom severe enough to demand specific treatment. Abdominal distention is frequent; probably more so than at later periods of childhood, but is seldom distressing.

Of *respiratory symptoms* bronchitis is common, but seldom a matter of importance, and epistaxis is rare. The *heart and pulse* are seldom much involved and only in the severest cases, a rapid pulse rate being the natural phenomenon in typhoid fever at this time of life. *Nervous symptoms* are, on the whole, not marked, those of depression being decidedly less frequent than those of excitation. The typhoid state of the adult is very ex-

ceptional. Prostration is not often great, but moderate irritability and fretfulness are frequently seen. Only occasionally does the disease simulate a meningitis.

The course of the *temperature* is uncharacteristic; a temperature steadily high or moderate, and later often irregular, being of frequent occurrence; and almost as frequent is one which is irregular from the beginning. Not only is the initial rise of temperature rapid, but the fall is so also in many cases, an almost critical fall being sometimes seen, and still oftener one which requires only three or four days for normal to be attained from the time the first decrease of fever shows itself. The morning fall and evening rise of the third period of the adult is very exceptional in infants. The total duration of the fever is three weeks or less in the great majority, and in at least one-third of the cases only two weeks or less.

The typhoid *roseola* is probably as common as in adults, but appears earlier, oftenest from the fourth to the sixth day. *Splenic enlargement* is found in at least one-half the cases. The *Widal reaction* is as characteristic as in adult life and leukocytosis is usually absent in spite of the fact that in infancy many outside causes readily disturb the leukocyte count. The *urine* often shows albuminuria, with casts in a considerable number of cases.

DR. HAND, discussing Dr. Griffith's paper, said his experience with infants bore out Dr. Griffith's conclusions. He would consider the Widal test of more value in confirmation of the diagnosis in infants than in adults. He agreed also that nose bleed is rare in infants and that short or abortive cases are more frequent at this time of life.

DR. MORSE agreed with Dr. Griffith as to the greater mortality and more sudden onset. The pulse also is not slowed in infants as it is in the case of older children and adults.

DR. CHURCHILL suggested that a blood culture would establish the diagnosis much earlier than the Widal reaction. He also found bronchitis in 95 per cent. of his cases.

DR. KERLEY asked how the children were fed, and upon Dr. Griffith's replying that most of the patients were given a milk diet, went on to say that he thought that the milk diet was probably the cause of the greater severity of the disease, the higher mortality and the greater number of complications than had been his own experience.

DR. GRAHAM said that his experience differed from that of Dr. Griffith in two particulars—first, that his mortality was much below 16 per cent., and, second, that he often sees house or family epidemics.

DR. TALBOT mentioned a case of a nursing mother whose milk contained living typhoid bacilli. He asked if it was frequent in the experience of the Society for nursing babies to develop typhoid.

DR. HELMAN said that he found it difficult to make diagnoses of typhoid in infants. He found blood cultures hard to take.

DR. ADAMS reported the infection of 10 infants with typhoid by a trained nurse suffering with the disease. In his experience, the mortality is higher in hospital than in private practice.

DR. GRIFFITH, in closing, said that 4 per cent. were one year or less, and 60 per cent. two years old and less. Bronchitis was present in at least 47 per cent., perhaps more. None of the infants was breast-fed.

DR. FRITZ B. TALBOT read, in collaboration with DR. FRANCIS G. BENEDICT, a paper on

SOME FUNDAMENTAL PRINCIPLES IN STUDYING INFANT  
METABOLISM.

DR. TALBOT said it has always been known that the amount of carbon dioxide excreted by the animal organism depends upon the amount of muscular exercise. It is, therefore, evident that no metabolism experiments are complete without a record of the amount of muscular exercise. The writers also find that the rapidity of the pulse rate of babies depends upon muscular exercise.

A special apparatus was devised by Dr. Benedict of the Carnegie Nutrition Laboratory of Washington, at Boston, by which a graphic record could be obtained of the amount of muscular exercise, by means of a bed balanced on a knife edge at one end, and attached to a spring and a pneumograph at the other, the pneumograph recording on a smoke drum any movements of the bed.

It was found that there was a very close connection between the amount of muscular activity as shown by the kymograph record, pulse rate, and the amount of carbon dioxide. The

writers, therefore, assert that all future work should be done as described in the original paper.

DR. HOWLAND said that the work of Dr. Talbot and Dr. Benedict is worthy of high commendation, and if the oxygen can be determined also, by some improvement of the apparatus, a great advance will be made. The foreign observers used the old apparatus. Twenty to twenty-four hour periods are a great mistake, because the children are in metabolism frames and are very fretful. Moreover, the methods used abroad are full of inaccuracies. The determination of the surface area of the infant is difficult and there is an error of at least 5 per cent. The best variable to use is that of weight rather than those of length and circumference. The formula  $y = mx + b$  in which  $y$  = the surface area in square meters,  $x$  equals the weight in grams,  $m$  equals 0.46 and  $b$  equals 700. Dr. Howland asked whether the apparatus used by Drs. Talbot and Benedict can be perfected so as to measure the oxygen directly.

DR. HAMILL asked whether the pulse rate always varied directly with the muscular activity.

DR. TALBOT replied that in a general way the pulse rate followed the muscular activity, although at times the pulse rate might vary ten or fifteen beats without any motion being visible to the naked eye. He hopes to have the apparatus perfected so as to determine the oxygen by next autumn.

DR. CHARLES GILMORE KERLEY read a paper reporting

A CASE OF RETARDED DEVELOPMENT TREATED WITH  
THYMUS EXTRACT.

Dr. Kerley said that although the removal of the thymus gland is not followed by death, yet it appears to play an active part in nutrition, especially in the early years of life. There seems to be an intimate relation between the thymus and sex glands in respect to their mutual development and their effect on nutrition. Removal of the thymus is followed by lack of development of the bones, which are of smaller size, softer, with a broader and more irregular epiphyseal line. Resistance to infections seems to be weaker in thymectomized animals.

The case in question was referred to Dr. Kerley at the age of sixteen years and four months, weighing 76 pounds stripped and being 56 inches high, about the size and weight of a twelve-year-old child. He had made no growth in two years, his tes-



ticles were small and undescended. There had never been an erection of the penis and there was no pubic hair. He was mentally normal and active in play.

For nine months a course of tonic medication with more rest and a proper diet was tried, with a resulting gain in weight of 3 pounds but no change in sexual development or height.

Then, at Dr. Beebe's suggestion, 15 grains of desiccated thymus extract were administered daily.

During the first six months the genitals enlarged and an erection occurred at the age of seventeen years and ten months. At the completion of a year hair appeared in the axilla and on the pubis. He had gained an inch in height and 11 pounds in weight. When eighteen years and four months of age his voice changed.

In the eighteen months during which he has been under treatment he has gained  $19\frac{1}{4}$  pounds and grown 3 inches. He seems to be normal sexually.

Dr. Kerley has 6 other cases under treatment which will be reported later, the present case not being reported as conclusive. Whether the thymus was the cause of the improvement or whether it was merely a coincidence in a case of late development, will remain to be seen.

DR. HOLT said that the report was interesting but not conclusive, since cases were not infrequently seen in which just such an improvement begins late in adolescence.

DR. RUHRÄH said that he had been interested in the use of thymus in marantic babies some years ago, but could not obtain positive results.

DR. HOWLAND said that experimentally it is possible to get almost any sort of evidence in regard to the thymus, but the results of animal experimentation cannot be carried over to human beings, especially if fowls be the animals used.

DR. CHURCHILL said that it was not yet possible to decide about the effects of thymectomy in children, and it is also very difficult to remove the entire thymus gland in human beings.

DR. GRIFFITH had seen this past winter 3 cases of stunted growth in which he had had no results from gland extracts.

DR. HEIMAN had used thyroid in small doses as a stimulant to metabolism.

DR. KERLEY said, in closing the discussion on his paper, that he presented his case simply as an observation and did not pretend to draw any conclusions from a single case.

DR. THOMAS S. SOUTHWORTH read a paper entitled:

DEXTRINS AND MALTOSE IN INFANT FEEDING.

Attention has recently focussed upon the injurious effects of carbohydrate intolerance and the relative toleration and absorbability of the different saccharides in such cases. In health the infant takes with about equal facility milk sugar, cane sugar or the so-called malt sugar. However, after injury caused by carbohydrates the order of toleration is malt sugar, cane sugar, milk sugar. The so-called malt sugars, so commonly referred to as maltose, are never pure maltose, but contain variable amounts of dextrins. Maltose is a disaccharide and crystalloid, fermentable and dialyzable. The dextrins are polysaccharides and reversible protective colloids, non-fermentable and non-dialyzable. The importance of this admixture of dextrins having such contrasting properties does not seem to have received due attention. Maltose and dextrins are a normal form of nutriment, since they are formed in the human economy from all starchy foods through the action of the salivary and pancreatic ferments. Maltose splits into two molecules of dextrose, which on reaching the liver are stored as glycogen, but in the general circulation again become maltose. Direct absorption of maltose from the digestive tract into the general circulation would therefore cause less disturbance than a similar absorption of lactose or saccharose. Gelatinized starch, a polysaccharide, acts as a protective against irritation of the intestines by sugars or the products of their fermentation. Part of the value of barley or other gruels in disturbed digestion and in diarrhea is explained this way. Dextrins, which are also polysaccharides, have a similar protective action, beside furnishing a reserve of potential sugar in a more dialyzable and non-irritating form, which does not flood with sugar the intestine or the system and is unfermentable until transformed into maltose. The dry forms of malt sugar have a high dextrin content, 40 per cent. to 60 per cent.; the thick fluid preparations, 10 per cent. to 15 per cent. Keller found that if he used much of the latter he must add gelatinized starch as a protective. The choice of a high or low dextrin content may be made for different types of cases. Milk

sugar and cane sugar can be so successfully used in normal feeding cases that there is no need of yielding hysterically to the temptation to use the malt products exclusively.

DR. JOHN LOVETT MORSE read a paper on

MALTOSE IN INFANT FEEDING.

DR. MORSE said in part that maltose is the most readily absorbed of the usual carbohydrates; saccharose next and lactose the least readily absorbed. Lactose, moreover, favors the predominance of the bacillus bifidus in the large intestine. Maltose, on the other hand, favors the growth of the bacillus acidophilus, which, if present in excess, may cause intestinal disturbance.

Dr. Morse believes that lactose is preferable to maltose in the feeding of normal infants. He thinks also that the use of a mixture of casein, cream, water and dextrin maltose preparations is better than the use of eiweissmilch, which contains the lactic acid of the buttermilk, a product of lactose fermentation.

DR. HOWLAND said that Sainmont had found experimentally that puppies do better with large quantities of lactose than they do with large quantities of maltose or dextrose.

DR. ABT thinks the malt preparations are of great advantage as regards gain in weight. Whether they affect the flora of the intestine is a question, for the bacteriology of the gastrointestinal tract is still in an undetermined condition.

DR. FREEMAN thought that Dr. Morse's warning about malt sugar was a timely one, especially as the scurvy of recent years is often produced by the use of malted foods.

DR. HOLT wished to emphasize the tendency of malted foods to cause scurvy. The chief advantage of malt foods in his estimation is to overcome the constipation in babies taking lactose. Bearing on the question whether the irritation of lactose was not due to bacteria, lactose and cane sugar in one particular set of experiments were found practically sterile, while the maltose contained many bacteria which were quite resistant to heat. Cane sugar was often of use not only in certain cases of difficult feeding, but also in certain premature infants.

DR. LA FÊTRA said that while milk sugar could be used safely with most normal babies, it was frequently of great advantage to substitute cane sugar or dextrin malt preparations in diarrheal cases, especially of the dysenteric type.

DR. COIT said that the chemist of the milk sugar trust admitted that their milk sugar contained bacterial toxins. For the past three years the milk sugar has been recrystallized by the trust and is much better. The most highly refined sugar is known as 3 X milk sugar. Dr. Coit has had much better success with using this sugar than he did formerly with the less pure form.

DR. HAND thought that milk sugar produces constipation and that this might be due to its diuretic effect.

DR. SOUTHWORTH added that starch intolerance may be easily overstepped.

DR. MORSE, closing the discussion, said that the results of the treatment of diarrhea last summer should not be taken as an indication of the value of different sugars and methods of feeding, because the diarrheal diseases were so mild.

DR. HENRY L. COIT read

A NOTE ON THE EFFECTS OF HEATED AND SUPERHEATED MILK ON  
THE INFANT'S NUTRITION: RECENT INVESTIGATIONS.

Dr. Coit said that he trusted that the bitter warfare which had for years been waged between the advocates of the use of heated and raw milk in artificial infant feeding would soon cease.

The pediatrician, however, would always be influenced in his teaching and practice by the results of his clinical experience, and yet his final judgments should also be influenced by the experience of others. No one could be a stronger advocate of raw milk than he when it was ideally clean and safe in the feeding of normal children, and he emphasized the universal agreement as to the great superiority of breast feeding over milk obtained from any other source. He did not believe, however, that the heating of milk was such a menace to its nutritive values that the champions of raw milk feeding would have us believe.

Dr. Coit referred to an English investigator, Dr. J. E. Lanc-Clayton, of London, authorized and working under the direction of the British Local Government Board. The report had just been published and embodied the results of an inquiry undertaken in connection with the parliamentary grant for scientific investigations. The report was upon the available data in regard



to the value of boiled milk as a food for infants and young animals and was presented in five parts.

In the summary, it was stated that the balance of evidence, both experimental and clinical, pointed in the main to the same conclusions. Both lines of research showed the following:—

(1) That there was apparently no serious loss of nutritive value produced by feeding an animal upon boiled milk derived from an animal of the same species. At the same time it must be pointed out that the published evidence on this point was scanty.

(2) That, when an animal was fed upon the milk of another species, the milk from which had been found suitable for this purpose, such small differences as had been found in the nutritive value of raw and boiled milk had been in favor of boiled milk.

(3) That the milk of the same species had a considerably higher nutritive value for that species than the milk of any other species so far investigated.

The evidence dealt with throughout this report emphasized very forcibly the importance of breast-feeding for the young of all species and showed the special importance of breast-feeding unless there was an urgent reason to the contrary. Where artificial feeding had been employed in animal experiments, boiled milk of a foreign species had given more satisfactory results than similar milk raw.

The Berlin figures dealing with infants fed on boiled cows' milk gave extremely favorable results. The Berlin babies who were artificially fed received milk of a known excellent quality, and the excellence of the results obtained were almost certainly largely due to the care and supervision exercised at and through the consultation.

DR. HAMILL asked whether the only basis of development in the work of this British Commission was gain in weight. He thought that this was a dangerous standard since proprietary foods often secure large gains in weight.

DR. ABT has been boiling the milk recently, being convinced that little babies are apt to digest the milk better if it is boiled.

DR. EATON thought that a discrimination should be made in regard to the kind of milk to be boiled.

DR. TALBOT thinks that all our energies should be directed

to obtaining a good, clean milk rather than to a consideration of the effect of heating it.

DR. SOUTHWORTH thought that home conditions must be considered, especially the presence of ice-boxes for keeping the milk.

DR. FREEMAN said that in his opinion we are now producing no clean milk which is safe and he believes in pasteurizing all milk used.

DR. CHURCHILL said that in contradistinction to Dr. Freeman's practice he himself rarely pasteurizes milk for his patients.

DR. KERLEY said that the effect of boiling the milk depended on what the mixture was when the milk was boiled.

DR. GRIFFITH thought that the tables shown were dangerous, showing as they did that boiled cow's milk gives nearly as good results as breast milk. It was evident that the other conditions were not the same and the tables should not be opposed.

DR. KNOX emphasized that the milk if it is heat treated should be used within a certain time after it is boiled. He feels that most milk should be pasteurized or boiled.

DR. HEIMAN said that he thought the use of boiled milk of advantage in many cases.

DR. ADAMS thought that the tables were dangerous and that the Society should oppose the teaching that boiled cow's milk could be compared to mother's milk.

DR. ROWLAND G. FREEMAN read a paper on

SERUM TREATMENT OF PNEUMONIA IN INFANCY.

DR. FREEMAN said that none of the newer methods of treatment of pneumonia had been demonstrated to be successful, more brilliant results having been obtained from the use of fresh air than from methods based on laboratory experiments. He reviewed the work on the use of leukocyte extract, vaccines and serum, and concluded that the results obtained from the use of the pneumococcus serum were on the whole quite favorable. He therefore undertook the injection of a series of cases in a New York institution, using the alternating cases as controls. There were included in his series 15 cases of serum injections and 15 controls. Only such children as had a high temperature

and good physical signs were injected, and on account of waiting for good physical signs some of the children were injected fairly late in the disease.

The dose of serum was large, 100 c.c. of pneumococcus serum having been injected in the first 7 cases of the series, while 50 c.c. each of pneumococcus and streptococcus serum were injected in the last 8 cases. The injections were made by means of a buret, rubber bulb and large needle, the force being gravity and by pressure from the rubber bulb, and the injections being made into the fascia of the anterior abdominal wall. No irritation followed at the point of injection; urticaria ensued in every case, but was not severe. In a number of the cases quite a marked reaction followed the use of the serum, the temperature falling and the signs clearing up in from one to four days. In 7 of the 15 cases the treatment seemed to influence the disease, while in the other 8 cases there was no effect and in some none after a second injection. The injections were usually followed by a reduction in leukocytes and in the percentage of polynuclear leukocytes. The injection cases that lived had a much shorter average course and slightly lower mortality than the controls. The pneumococcus serum presents a safe method of attempting to influence the course of pneumonia in children; the addition of antistreptococcus serum seems to offer no advantage over the use of the pneumococcus serum alone.

DR. SOUTHWORTH asked whether more than one injection had been used in any case.

DR. NICOLL said that he had had quite a good deal of experience with pneumococcus serum in pneumonia. He could not yet make up his mind in regard to its efficacy, but he was sure that not less than 100 c.c. should be used. Dr. Nicoll had given what he considered a prophylactic dose of serum (equal parts of pneumococcus and streptococcus) before there were signs of pneumonia or bronchopneumonia in a series of intubated diphtheria cases in which the mortality had been large. He found, however, that the death rate was about the same in both series of cases. In his opinion the serum should be given into the veins, 100 to 200 c.c. at a dose. Aside from the urticaria, he had seen no bad results from these injections.

DR. HAND has had only a limited experience with antipneu-

mococcus serum. At first his cases seemed to do very well. Then he had some poor results which were explained as being due to the prevalence in these cases of a different strain of pneumococci.

DR. THOMAS C. McCLEAVE (guest) said that one of the large commercial manufacturers of serums had discontinued making antipneumococcus serum on account of the unfavorable reports of its action.

DR. FRANK S. CHURCHILL, of Chicago, read a paper on  
THE WASSERMANN REACTION IN INFANTS AND CHILDREN: A  
CLINICAL STUDY. (See Current Literature, p. 471.)

DR. NICOLL said that we cannot accept the conclusions of Dr. Churchill's article, since the Noguchi reaction is not accepted as evidence by the best observers. The Noguchi reaction is too delicate to be considered reliable. Moreover, the list of cases given by Dr. Churchill has the appearance of being a picked list. Again the autopsy in 3 cases which had positive Noguchi showed no syphilitic lesions.

DR. FREEMAN said that at the New York Foundling Hospital the pathologists had great difficulty in finding evidence of syphilis at autopsy in many cases thought during life to be syphilitic.

DR. CHURCHILL in closing said that he thought his paper suggestive especially in view of the reports in the literature.

DR. L. E. LA FÉTRA read a paper on

THE EMPLOYMENT OF SALVARSAN IN INFANTS AND YOUNG  
CHILDREN.

DR. LA FÉTRA reported 25 cases of congenital syphilis. Of these 10 were treated by the intravenous injection of salvarsan. There were no bad results, and only slight temperature reaction in 3 cases. Two patients received second injections. The Wasserman reaction became negative in only 1 case, and that after a second injection and the use of mercurials. The dosage given was probably insufficient and the dose should be not less than 0.01 gram per kilogram of body weight.

DR. HOLT in discussion of Dr. La Fétra's paper said that at the Babies' Hospital they had given thirty-seven injections in 24 patients. They had found general anesthesia advisable. They did not use a needle but small glass tubes made for the purpose.



With these, after a vein was exposed, the time for injection was from six to ten minutes and much less than with the needle.

DR. BUTTERWORTH said that he had made use of the vein running over the internal malleolus. Repeated small doses give better results than single large ones.

DR. TALBOT said that Dr. Beth Vincent in Boston had found that injections through the jugular vein were best.

DR. EATON gave a further report of the case of

DIABETES MELLITUS IN A CHILD UNDER ONE YEAR OF AGE.

(See ARCHIVES, Vol. XXVIII., p. 905.)

which he reported at the last meeting of the Society. The baby was now twenty-four months old. It is still having an acidosis and still eliminating glucose, though on a carbohydrate free diet. At times it has coma which is relieved by sodium bicarbonate. The last specimen of urine showed a specific gravity of 1.030, acetone and diacetic acid present. It has gained in weight and is thriving.

DR. S. S. ADAMS read a paper on

THE INFLUENCE OF MILK STATIONS ON INFANT MORTALITY.

(This article will appear in a forthcoming number of the ARCHIVES.)

DR. FREEMAN in discussion of this paper said that it is a moot question whether it is the education or the milk which does the most good at the milk stations. Dr. Freeman thinks that the statistics show that the giving of milk in France had reduced the mortality in certain French cities by 60 per cent. In New York, a certain section of the city had education but no milk. The reduction from this was 15 per cent. Dr. Freeman is led to believe that there is much greater reduction from the dispensing of milk rather than from education alone.

DR. KNOX said that he thought one feature of importance is the prenatal visiting of the mothers. This tends to prevent serious illness among the newly born babies. To accomplish this there must be coöperation with the obstetrical clinic. Last year in Baltimore, there was among over 400 such children a mortality of only about 5 per cent. Of these children, 60 per cent. were exclusively breast-fed and 20 per cent. more partially breast-fed for six months.

DR. COIT would emphasize the importance of the nurse in the infant milk station and the importance of the distribution of *good* milk.

DR. ADAMS said that no patent foods were used in these stations. The milk was used either raw or pasteurized and delivered in pails packed in ice.

A CASE OF FETAL CHONDRODYSSTROPHY.

DR. LA FÉTRA presented photographs, X-ray prints and specimens of a case of fetal chondrodysstrophy dying at the age of six weeks. The case showed all the characteristic lesions of the condition with the exception that there was no trident hand. In this case, moreover, there was very marked exophthalmos. Autopsy showed congenital defect of the palate and a patent ductus Botalli.

The following papers were read by title:

THE SOURCES AND PATHS OF MENINGEAL INFECTIONS.

By Dr. David Bovaird, Jr.

THE SIGNIFICANCE OF THE PYLORIC REFLEX IN THE TREATMENT OF TRUE AND PSEUDO PYLORIC STENOSIS AND A GRAPHIC CHART METHOD OF STUDYING AND TEACHING THE PRINCIPLES OF INFANTILE NUTRITION.

By Dr. David Murray Cowie.

ACUTE YELLOW ATROPHY IN A CHILD THREE YEARS OLD.

By Dr. Francis Huber.

TRIALS OF THE PHENOLSULPHONAPIIHTHALENE TESTS FOR RENAL FUNCTION IN CHILDREN.

By Dr. Henry D. Chapin.

CONCERNING SCURVY AND MODERN CONDITIONS.

By Dr. William P. Northrup.

FEEBLE-MINDED CHILDREN. WHAT SHALL WE DO WITH THEM?

By Dr. Charles P. Putnam.

WEIGHT CHARTS OF ARTIFICIALLY FED BABIES.

By Dr. Percival J. Eaton.

AGE AND SEASONAL INCIDENCE OF DISEASE IN CHILDREN.

By Dr. Charles Herrman.

THE RELATION OF HEAT AND HUMIDITY ON INFANT MORTALITY.

By Dr. William Palmer Lucas.

## CURRENT LITERATURE.

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### ABSTRACTS IN THIS NUMBER BY

DR. CHARLES E. FARR.

DR. WILLARD S. PARKER.

DR. R. S. HAYNES.

DR. RICHARD M. SMITH.

DR. ALFRED F. HESS.

DR. J. HERBERT YOUNG.

### PATHOLOGY.

MORSE, MARY ELIZABETH: THE BLOOD PLATELETS IN NORMAL WOMEN, IN OBSTETRICAL PATIENTS, AND IN THE NEWBORN. (*Boston Medical and Surgical Journal*, March 21, 1912, p. 450.)

The author studied the platelets in 12 normal infants during the first nineteen days of life, using the method of J. H. Wright.

Counts made at birth showed the greatest variations, the lowest being 100,000, the highest 412,000. It was found that those having a high count at birth show a decrease during the first few days, so that after that time all infants range between 350,000 and 450,000.

Platelets in an infant of four weeks were 360,000; in one of seven weeks, 398,000.

Counts on 3 cases of idiopathic icterus showed a marked increase, the maximum, in one case 1,100,000 being attained as the jaundice was clearing.

In 2 cases of hemorrhagic disease of the newborn there was no diminution at the onset, but a posthemorrhagic rise in one case 699,000 eight days after cessation of bleeding, in the other 932,000 nine days after cessation of bleeding.

In a case of dermatitis exfoliativa neonatorum, the platelets were 279,000 one day before death.

In a case of pemphigus foliaceus neonatorum two counts during recovery showed 658,000 and 524,000.

WILLARD S. PARKER.

GOODALL, HARRY W.: A METHOD FOR DETECTING BILE IN STOMACH CONTENTS. (*Boston Medical and Surgical Journal*, March 28, 1912, p. 487.)

The author recommends this method, based upon the oxidation of bilirubin with nitric acid forming green biliverdin, as

being easy of application and sufficiently delicate to detect bile in 4 or 5 drops of contents diluted with  $\frac{1}{2}$  test-tube of water when the macroscopic appearance of the contents does not suggest its presence.

Saturate half a test-tube of the fluid portion of the contents with powdered ammonium sulphate (about one inch in bottom of a test-tube); add from 1 to 3 c.c. of acetone. Mix by inverting several times. After standing a minute or two the acetone rises to the surface carrying the bile pigment with it. Allow one drop of nitric acid to run down the side of the test-tube. If bile is present a green color appears in the acetone layer.

WILLARD S. PARKER.

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## SURGERY.

HIBBS, RUSSELL A.: A FURTHER CONSIDERATION OF AN OPERATION FOR POTT'S DISEASE OF THE SPINE. (*Annals of Surgery*, May, 1912.)

Hibbs reports the late results in 3 cases of Pott's disease of the spine in which he had performed his new operation of arthrodesis. Two were in children, seven and nine years respectively, and one a young adult, all 3 having advanced and active tuberculosis. The results were excellent, firm, bony union occurred and the patients were able to discard all braces and enter into the normal activities of life. Thirty-three other more recent cases have been operated upon by the author with excellent primary results, the wounds having healed without reaction and without complication. Eighteen of these cases have discarded the braces entirely and are now free of all symptoms of disease.

The operation itself is very simple, and consists in elevating the periosteum from the spines and laminae of a sufficient number of vertebrae, cutting across the spinous processes and breaking them down in such a way as to form a continuous bony chain above, at, and below the diseased portion. Similar chains are formed on either side by cutting off small portions of the laminae and fitting them into the interstices. The periosteum is then carefully united over the whole, and the skin and muscle planes closed without drainage. The patients are kept in bed for eight



weeks, and are then kept in braces for about three months. This operation certainly gives promise of being a great aid in the treatment of these most serious cases. In economy of time and money and in the alleviation of the discomforts of brace wearing this procedure is truly a great boon.

CHARLES E. FARR.

VINCENT, BETH: BLOOD TRANSFUSION FOR HEMORRHAGIC DISEASE OF THE NEWBORN: THE USE OF THE EXTERNAL JUGULAR VEIN IN INFANTS. (*Boston Medical and Surgical Journal*, April 25, 1912, p. 627.)

Vincent refers to his paper, "Blood Transfusion in Infants by Means of Glass Tubes" (*American Journal of Diseases in Children*, May, 1911, p. 376), in which he gives the technic of the operation, the report of 3 successful cases and the experimental work on the subject. In the present paper he reports 4 cases successfully transfused by means of connecting with a glass tube the radial artery of the donor to the external jugular vein of the infant instead of to the femoral vein, as was his previous method.

The external jugular vein was found to be in more convenient position than the femoral, to be more superficial, to have no troublesome branches and to be of the same, or even of larger, caliber than the femoral. The use of a tube 12 cm. long extending beyond the infant's head renders the connection to the donor's artery easy.

By this method blood is transmitted almost directly into the infant's heart, so that the inflow must be controlled by pressure on the donor's artery, it being necessary to check the flow entirely at times to allow the infant's heart to recover from temporary dilatation.

Vincent's 7 cases show that transfusion by means of coated glass tubes of the proper dimensions is safe and confirms the conclusion of others that hemorrhagic disease of the newborn can be cured by transfusion.

WILLARD S. PARKER.

LE DAMANY, P.: CONGENITAL DISLOCATION OF THE HIP-JOINT. (LA LUXATION CONGÉNITALE DE LA HANCHE.) (*Archiv. Gén. de Chirurg.*, Paris, March, 1912.)

De Damany advocates early treatment in these cases, beginning at from one to three years of age, the chief difficulty being

to keep the children clean while in the apparatus. He gives a large number of illustrations of orthopedic and sanitary apparatus, and radiographs of the cases. Of 426 children he has attained an anatomic cure in 97 per cent.; all were under eleven years of age, and all bilateral cases were under seven. In 3 cases the head of the femur was left a little too high on one side, and in 4 cases the result was a failure on one or both sides. The functional result in children from one to four years of age was perfect in from six months to two years after the close of treatment. One important factor in the treatment is functional training by weight bearing. At first the hip is immobilized and later the action of the muscles is used to overcome the twisting of the femur, on the Lorenz principle. CHARLES E. FARR.

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## MEDICINE.

CHURCHILL, FRANK S.: THE WASSERMAN REACTION IN INFANTS AND CHILDREN: A CLINICAL STUDY. (*American Journal of Diseases of Children*, June, 1912, p. 363.)

This paper deals with the class of children who are anemic, undersized, with lymph nodes usually enlarged, often with a high leukocyte count and presenting a condition which *may* be due to syphilis. It endeavors to determine:

1. What proportion of hospital children will show a positive serum reaction.
2. What proportion of positive cases show signs suggestive of syphilis.
3. Does a positive serum reaction in a child without physical signs mean syphilis?

The author used the Noguchi modification of the Wasserman reaction which he regards as "fully as reliable as and perhaps more sensitive than the Wasserman technic and yet in the hands of an expert not too sensitive."

Tests were made on 102 infants and children. On these children 111 tests were made, 28 Wasserman and 83 Noguchi. The blood was used in 90 cases, the spinal fluid in 12 cases. There were 39 positive reactions, 62 negative and 1 case with a positive Noguchi but a negative Wasserman. Thus 38 per cent. of the cases gave a positive serum reaction. None of these

children entered the hospital as a case of syphilis. A great variety of diseases were represented, involving practically all of the different systems of the body.

Of the 39 positive cases, 4 only gave a definite history of clinical syphilis in another member of the family, or a positive Wasserman reaction in either parent. Sixteen gave a suggestive history; 18 a negative history, and in 2 no history was obtainable. Of the positive cases who died, 9 were autopsied. All had given positive Noguchi from either blood or spinal fluid ante- or postmortem. None gave macroscopic or microscopic evidences of syphilis at autopsy.

Grouping these cases according to history, personal record and physical signs, the author regards as probably syphilitic 29 cases or 28 per cent. of the whole series of cases.

He concludes that we are justified on the basis of the observations made in this paper in which nearly one in three cases in a series of cases admitted to one of our large American hospitals was to be regarded as syphilitic, that there is a large amount of congenital syphilis among certain classes in the community—a matter of grave concern to all. He points especially to the large number of symptomless children who gave positive reactions and believes that the importance of the serum test in studying anemic maldeveloped children has been demonstrated.

R. S. HAYNES.

MORROW, LOUISE, AND BRIDGMAN, OLGA: GONORRHEA IN GIRLS: TREATMENT OF 300 CASES. (*Journal of the American Medical Association*, May, 1912.)

Fifty-five per cent. of the 200 girls committed each year to the Illinois State Training School for Girls are infected with gonorrhea at entrance. The cases are of all degree of severity, from the mild innocent infections to the virulent and obstinate cases of the prostitute and habitual masturbator. The diagnosis is made by a microscopic examination of the discharge, and the treatment is begun immediately and kept up for two months after all gonococci have disappeared from the discharge. Other examinations are made each month so long as the girls remain in the institution.

Several methods of treatment have been tried, and the authors conclude that the best for cases in which the speculum can be used is the weekly application of 25 per cent. silver nitrate to the

cervix and 10 per cent. to the vagina, followed by an application of petrolatum. Another treatment each week is given with a 25 per cent. emulsion of iodoform in glycerin. This treatment is not improved by the use of gonococcus vaccine. For little girls and virgins with an innocent infection, local cleanliness and the use of gonococcus vaccine give the best results. Because of the tendency to recurrence of the infection, however, this is not entirely satisfactory. Vaccine is of the greatest use in cases with joint complications. Here it is almost invaluable. Douching is worse than useless. In those cases in which a vigorous local treatment alone has been used, the results have been exactly as satisfactory as when this treatment has been combined with the vaccine. The use of vaccine, moreover, is very expensive. The time required for apparent cure ranged, on the average, from two to eleven months.

CHARLES E. FARR.

STILL, G. F.: PYELITIS IN CHILDREN. (*North of England Clinical Journal*, January, 1912, p. 1.)

Still believes that pyelitis is usually an ascending infection. The predominance of girls in his series of cases, 23 out of 26 cases under one year, is consistent with this view. Rigors in infants are extremely rare, except in pyelitis. There may be no actual shivering, but the infant suddenly becomes cold, blue and collapsed. Straining or discomfort in, or frequency of, micturition was rarely present. The heat test is the only reliable test for albumin in the urine. He objects to an examination of a centrifugalized specimen or of the sediment on standing as only by an examination of a shaken up specimen can an idea of the relative amount of pus be obtained. Alkalinization of the urine with potassium citrate is the treatment recommended. The only gauge of efficiency of the dosage is the reaction of the urine. Eight to ten grains every two hours for an infant and 20 or more grains every two hours for a child three years old is often required. If potassium citrate disturbs the digestion the alkalinization of the urine may be maintained by potassium or sodium bicarbonate. Potassium citrate should be continued at the efficient dosage for ten days after the temperature becomes normal, or until pus cells disappear from the urine. If alkalis fail urotropin or salol should be tried. When all drugs fail vaccine treatment with an autogenous vaccine is recommended.

J. HERBERT YOUNG.



HEWES, HENRY F.: THE GAS BACILLUS AS AN AGENT OF INTESTINAL FERMENTATION AND DIARRHEA. (*Boston Medical and Surgical Journal*, January 18, 1912, p. 75.)

From the study of a number of cases of acute and chronic dysentery in adults in which the *B. aerogenes capsulatus* was found, either alone or with other organisms, the author concludes that this organism plays an important part in the continuance of the fermentation and diarrhea, although there is no definite evidence that it is the primary etiologic factor, as it is in the dysentery of infants in whose feces the bacillus is not normally found (Kendall and Smith, *Boston Medical and Surgical Journal*, March 2, 1911). The author noted a marked decrease in symptoms upon withdrawal of carbohydrate food and an immediate exacerbation when starch or sugar feeding is resumed, which is in accordance with the observations of others on the same condition in infants and confirms the conclusion that the gas bacillus is most active in a carbohydrate media. The necessity for differentiating these cases early by culture of the stool is quite plain.

WILLARD S. PARKER.

HAMBURGER, F.: EDEMA DUE TO SALT IN CHILDHOOD. (UEBER SALZÖDEME BEI ÄLTEREN KINDERN.) (*Münch. Med. Woch.*, November 21, 1911, p. 2,500.)

Hamburger reports a case that illustrates the fact that in older children, as well as in infants, a large amount of salt in the diet may produce edema in the absence of nephritis or heart disease. His patient was a boy five years of age who had long suffered from dyspepsia and neurasthenia. After various methods of treatment had failed he was ordered a Carlsbad cure. Nine days of treatment produced a marked general anasarca, with a gain of weight of 3 kilos. After three days on a diet poor in salt he lost  $2\frac{1}{4}$  kilos and the edema soon disappeared entirely. The writer has subsequently found that in emaciated and cachectic children excessive administration of salt frequently produces edema. The exceptions are usually cases in which excess of salt produces diarrhea.

J. HERBERT YOUNG.

HESS, ALFRED F.: THE USE OF A SIMPLE DUODENAL CATHETER IN THE DIAGNOSIS AND TREATMENT OF VOMITING IN INFANTS. (*American Journal of Diseases of Children*, March, 1912, p. 133.)

The author reports the use of a soft rubber catheter as a

duodenal tube for investigation of digestion in the duodenum. He believes that this is a more satisfactory instrument than the duodenal catheters previously recommended. The technique is simple and the results obtained are satisfactory. It can be used not only in diagnosis, but in treatment. He recommends its wider application.

RICHARD M. SMITH.

MCNEIL, CHARLES: TUBERCULOUS INFECTION IN INFANCY AND CHILDHOOD, AS REVEALED BY THE CUTANEOUS TUBERCULIN TEST: AN ANALYSIS OF 541 CASES. (*Edinburgh Medical Journal*, April, 1912, p. 324.)

McNeil performed the cutaneous tuberculin test in 541 children ranging in age from a few weeks to fifteen years. Undiluted old tuberculin of Koch was used and was applied to the skin as follows: A small circular area of epidermis was chafed off with the point of a needle, care being taken to avoid bleeding. On this denuded area of corium the head of a darning-needle charged with tuberculin was pressed in with a rotary motion, forming a small bruised pit from which the fluid was rapidly absorbed. This trifling modification of v. Pirquet's method was found to increase the sensitiveness of the reaction. The cases were divided into two groups. The first group numbered 371 cases from the Royal Edinburgh Hospital for Sick Children and forms a representative group of the in-patients of the hospital. The second group numbered 170 cases from a boys' industrial school. These boys were drawn from the very poorest class of town populations, but they were apparently free from active disease. Of the 371 cases, 37.7 per cent. gave a positive reaction; of the 170 cases, 59.4 per cent. gave a positive reaction; of the total 541 cases, 44.5 per cent. gave a positive reaction. The hospital cases arranged according to age show that tuberculous infection reaches a maximum during the fourth and fifth years of childhood. These statistics, showing that nearly half the children that seek admission to the hospital are infected with tuberculosis before school age, suggest that the amount of tuberculosis, latent or active, at later periods may not be due to any appreciable extent to fresh infection during the period of school. Tuberculous infection is already apparent as a chronic process during the first year of life. Of the 9 positive results obtained in his group, 7 were in children not clinically tuberculous. Abdominal tuberculosis, in large part at least a bovine infection, is

nine to ten times as common in Edinburgh and Glasgow as it is in New York and Boston. In 330 cases a cutaneous test was made with both bovine and human tuberculin but did not prove to offer a means of discriminating between the two types. In 258 both were equally positive or negative; in only 9 cases where both were positive was the reaction to the bovine tuberculin stronger. In no case was the reaction to human tuberculin negative and to bovine tuberculin positive. J. HERBERT YOUNG.

DRAPER, GEO., AND PEABODY, F. W.: THE STUDY OF THE CEREBROSPINAL FLUID AND BLOOD IN ACUTE POLIOMYELITIS. (*American Journal of Diseases of Children*, March, 1912, p. 153.)

The author's report investigations conducted at the Rockefeller Institute for Medical Research on the fluid of cases of acute poliomyelitis. They examined in all 233 fluids from 69 patients. In almost every instance the fluid was clear, colorless and watery, sometimes slightly opalescent. On standing a delicate weblike clot formed in a small proportion of cases, most frequently in the early stages of the disease. All fluids showed the power of reducing Fehling's solution and also showed no variation from the normal in the chloride content. The cells present were mononuclears. Early in the disease, especially before the paralysis, the polynuclears sometimes outnumbered the mononuclears. The highest counts were found in the earliest days of the disease. The globulin content was usually low in the first part, but increased during the second and third week and then decreased again. There were two distinct types of fluid found, one with a high cell count and the normal globulin reaction, the other a fluid with normal cell count and a marked globulin reaction. The cellular exudate is associated with the earliest stages of the disease. The albuminous exudate with the latter stage of the disease. So far as an aid to diagnosis is concerned, a certain amount of evidence can be obtained which may be of assistance. In a fluid with high percentage of polynuclear cells a failure to find any organisms would certainly be suggestive of poliomyelitis in the preparalytic stage. An investigation was also made of the blood of poliomyelitis cases, and it was found to contain a marked leukocytosis. In several instances the count was 30,000. In only one case was there a definite leukopenia. There was a constant increase in polynuclear cells above the normal and a diminution in lymphocytes. RICHARD M. SMITH.



HAAS, SIDNEY V.: ACUTE GLANDULAR FEVER IN CHILDREN. (*American Journal of Diseases of Children*, April, 1912, p. 241.)

The author discusses the condition characterized by fever, malaise, acute swelling and tenderness of the glands of the neck. The pathology is obscure but probably is a streptococcus infection. It is quite possibly contagious and almost always occurs in patients under ten years of age. The disease may take a variety of courses, but the prognosis is good in almost every instance. The diagnosis must be made from adenitis secondary to an acute nasal process, from tuberculous and syphilitic adenitis and from various general diseases accompanied by enlarged glands. The treatment is almost in every instance expectant with the administration of hexamethylamine and sometimes local applications. The disease is followed by a secondary anemia.

RICHARD M. SMITH.

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### INFANT FEEDING.

LOBLIGEIS, F.: INCREASE OF THE SECRETION OF MILK BY PHYSICAL METHODS. (PHYSICOTHÉRAPIE ET SÉCRÉTION LACTÉE.) (*Le Progrès Médical*, October 28, 1911, p. 525.)

Of purely physical means for increasing the secretion of milk one of the most efficacious is repeated suction. This may be effected by a breast pump, a vigorous child or even a puppy or by means of Bier's apparatus. By this means lactation may be possible after its suspension for an interval of several months. All physical means of increasing the mammary secretion appear to act by causing congestion of the gland, and the most reliable of these appear to be hot applications such as poultices, suction, and the use of the faradic current, of which the last produces the most rapid and durable results.

J. HERBERT YOUNG.

DAVIS, WILLIAM H.: PREVENTION OF INFANT MORTALITY BY BREAST FEEDING. (*Boston Medical and Surgical Journal*, February 15, 1912, p. 242.)

The author obtained the following figures from replies in answer to letters sent by the Boston Board of Health to mothers figuring in the birth returns of the Registry Department, from reports by the Board of Health nurses, and from the death returns. The cases were not selected, but taken at random from



the various wards and nationalities there represented, care being taken, however, to select proportionate numbers from various age periods.

From 736 replies it was found that of living babies 72.4 per cent. were breast fed and 27.6 per cent. bottle fed, Italy leading with 86 per cent. breast fed, Russia and Poland next with 82 per cent., Ireland and the United States 77 per cent. and 64 per cent. respectively, Canada 55 per cent. Corrected percentages obtained by death additions to the above give the total breast fed as 68 per cent, bottle fed, 32 per cent.

The deaths were also tabulated to show the relative mortality by month, by age, and by method of feeding, and the following facts shown:—

(1) That there is only a slight increase of death rate among breast fed babies during the summer months; July, August and September, with 119 deaths, are lower than February, March and April, with 128.

(2) That there is a great increase of death rate among the bottle fed babies during the summer months; July, August and September show 502 deaths; February, March and April show 268.

(3) That only 26 per cent. of infant deaths between the ages of two weeks and one year occur among breast fed babies, and of infants over two weeks old, born of native mothers, only 16 per cent. of the deaths occur among breast fed children; while of babies over two weeks of Italian mothers, 53 per cent. of the deaths occur in the breast fed.

(4) Bottle fed babies between one and three months show the highest mortality, especially those of native mothers.

(5) Total infant deaths, 2,245, or 127 per 1,000 births.

From the above figures the author makes the following striking estimates:—

(1) That if 74 per cent. of infant deaths above the age of two weeks are among the bottle fed, while only 32 per cent. of babies over two weeks old are bottle fed, then the bottle fed baby over two weeks old is six times as likely to die as the breast fed.

(2) There were in 1911 621 deaths from diarrhea and enteritis, of which 87 were breast fed and 534 bottle fed, *i.e.*, 86 per cent. bottle fed. If all the babies had been breast fed the estimated deaths would have been 493 less.

(3) That breast feeding of all babies in 1911 would have saved over 1,000 lives, reducing the death rate per 1,000 births from 127 to 71, making the total deaths among children of native mothers 470 less, Irish 160, Canadian 97, Italian 87, Russian and Polish 85 less respectively.

The author believes that such a saving of infant life is not impossible and cites New Zealand with a rate in 1909 of 62 and South Australia for the same year 61.

WILLARD S. PARKER.

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## BOOK REVIEWS.

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INFANT FEEDING. By CLIFFORD G. GRULEE, A.M., M.D., Assistant Professor of Pediatrics at Rush Medical College, Attending Pediatrician to Cook County Hospital. Octavo of 295 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1912.

This is a very welcome book. It is some time since a book exclusively upon the subject of infant feeding has fallen into our hands, certainly not since the penetration to our country of the ideas of Heubner, Czerny, Keller and Finkelstein. It is notorious, that with the rarest exceptions, the subject of infant feeding is poorly handled in the general text-book on diseases of children. It may be because of lack of space, it may be because of a lack of appreciation of the needs of the learner or of the manifold phases of the subject. It is a pleasure then to take up Dr. Grulee's book and find in it so sensible and withal so comprehensive a survey of the field. Unlike many pediatricists who have been influenced by the work of German authors, Dr. Grulee has not outhiered Herod in demanding the complete abandonment of all regard for the relation of food elements in the composition of food and a slavish adherence only to the fuel value, but recognizes that the individual child, even when normal, is a law unto itself; and so wisely refrains from laying down absolute feedings covering every contingency of age, weight and appetite. It is particularly in his chapters upon the signs of ineffectual feeding and upon the methods of feeding to be adopted in certain well-recognized conditions that a great deal of material which has not

hitherto been available to an English-reading medical public is to be found admirably presented.

In his individual ideas of the length of feeding intervals, which is four hours for both breast-fed and bottle-fed babies, Dr. Grulee does outdistance even the German authorities and probably will not be followed by many Americans, though it is a wholesome reaction from the all too prevalent two and two-and-a-half hour interval.

The book has a moderation about it which is commendable and which makes it a safe and valuable guide to the student of infant dietetics. Following its teaching he will never go far wrong and will possess an excellent knowledge and modern views of this kaleidoscopic subject.

THE HEALTHY BABY: THE CARE AND FEEDING OF INFANTS IN SICKNESS AND IN HEALTH. By ROGER H. DENNETT, M.D., Instructor in Diseases of Children in the New York Postgraduate Medical School; Assistant Attending Physician to the Babies' Ward in the New York Postgraduate Hospital, etc. Pp. 235. New York: The Macmillan Company, 1912.

This is on the whole an excellent example of this type of book. It does not and cannot pretend to be a complete manual for mothers. It does express the author's views on a great many subjects of infant and child welfare in a helpful manner which does not pretend to displace actual medical attention. The subject of infant feeding has been simplified to a considerable extent, the attempt being made to indicate how to feed a well child only. An ingenious table indicating the formula advised according to age and weight will be of service to the seldom too mathematical mother. It is perhaps fortunate that the feeding of only well babies is indicated, for the formulas given exceed in caloric value throughout the commonly accepted standard, and the amount of protein is high because the "system" is based upon the giving of 2 ounces of milk for each pound of body weight; an amount the author states in italics the baby needs to sustain life and make a proper gain. The feeding intervals also are two hours up to fourth month, two and one-half hours to the fifth month, and three hours thence to the first year, a surprising contrast to those of Dr. Grulee (see above).

Several convenient tables for recording weight and progress are appended and the book is convenient and well made.

# ARCHIVES OF PEDIATRICS

JULY, 1912.

ROYAL STORRS HAYNES, Ph.B. M.D.,

EDITOR.

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## EDITORIAL.

### CONCERNING THE ORDINARY MILK SUPPLY.

We print elsewhere Dr. Coit's resumé of the code of standards adopted by the American Association of Medical Milk Commissions for the certification of milk, and call the attention of our readers to the newer regulations as presented here and in the Public Health Report for June 14, 1912.

It is not out of order to recall at this time the pioneer work which Dr. Coit did twenty years ago by establishing the first certified milk dairy. It cannot but be a source of gratification



to him to view the present-day aspect of the clean milk idea and to contrast it with the conditions obtaining when the Essex County Medical Milk Commission began its work.

No one nowadays, that is, no one who thinks, denies the value of clean milk, milk produced from healthy cows, by clean methods, and showing a low bacterial count. There are many who agitate the question of heat treatment, and toss back and forth that apple of discord, pasteurization, descanting upon its necessity or needlessness, upon the relative values of the instantaneous method, of the holding method, of pasteurization in bottles and of the complete sterilization of milk. We doubt if any of the most ardent believers in the necessity for pasteurization will object to having at the start milk of the quality required for certification. Those of us who feed babies feel that we must have milk of this quality whether it be heated or not. Thanks to the work of the medical milk commissions and various broad-minded milk producers, we pediatricists can find in almost every community a milk which is clean enough to use in feeding babies. We can usually get the mothers to buy it for their babies when it becomes somewhat like a prescribed medicine in the household economy and as soon as the doctor can be got to consent, in most households will be discontinued, and a cheaper milk used.

Mothers will complain bitterly when asked to buy certified milk at an advance of 5 or 6 cents per quart when the total extra expense for a month will not equal one visit to the theatre or a hair dresser and manicure, or other like essentials. Only when it is pointed out that the use of clean milk will undoubtedly prevent illness and doctors' visits, and that one of our visits will cost more than the added cost of certified milk for a month, do they begin to see light. Beef juice has quite a vogue among even the poorest classes of society, who assiduously give it to their own children or recommend it for the innocent offspring of others. Yet it is an expensive food and it takes 2 quarts of

it to equal in caloric value 5 ounces of milk. Again, people do not hesitate to pay 5 cents or more apiece for fresh eggs in New York in the winter. It would take more than six eggs to equal the food value of a quart of 15-cent certified milk. And so with meat. The public demands the best cuts of meat and will not tolerate indifferent eggs, much less "rots and spots," while they will take milk which is quite as unwholesome as the latter.

The ideas of the public in regard to this particular article of food must undergo considerable alteration before anything like consistency is approached. It is really absurd that such poor milk should be utilized in households which are minutely particular as to the freshness of eggs, the delicacy of butter, the flavor of olive oil and the vintage of wines; or that such a discrepancy in quality should be allowed as when the 10,000 bacteria maximum certified milk is used for the baby and the 1,000,000 bacteria, ordinary milk is used by grown-ups and older children.

Such a discrepancy would not be tolerated in other articles of diet, because people know how to judge of their quality and have been educated up to demanding what is best. Milk they regard simply as "milk." They expect it to be cheap as it always has been. They do not appreciate how greatly the growth of cities has increased the expense of putting milk upon the table, and how certain it is that milk will spoil nowadays unless greater care is taken with it than was sufficient when the farmer milked his own cows and delivered the milk soon after milking and when the price to which they are accustomed was established.

The absurdity of the price of milk is only too evident. In twenty years ordinary milk has increased in price 1 cent a quart in spite of the fact that the price of cows, the price of feed and the cost of labor have advanced, greater distances have to be covered and a greater degree of coldness is insisted upon. Few articles of diet, if any, have changed so little.

It is only by a great awakening of the better minded people in the community that a satisfactory solution of the general milk problem can be reached. At the present prices for ordinary milk it cannot be clean and must be heated to be even admissible. For the price paid to the farmer he cannot produce anything better. Dr. North has shown that by coöperation and direction and increased pay for cleaner milk a product closely approaching certified milk in bacterial count can be produced at a much lower cost. But even with this the farmer makes practically nothing on his milk, and if he reckoned in the depreciation of his plant, the interest on his investment, the value of his own and his family's time and labor, in nine cases out of ten it would be found that on this proper basis for calculating he is actually losing money. It is only because the cows can be left practically to themselves and the milking done by the farmer's family or the hired man as a "chore" that the farmer, even at his own reckoning, comes out without loss.

It is impossible to produce clean milk without much care and some specialization. It cannot be properly done by unintelligent and careless people who expect to make little out of it and who expect it to take care of itself. It must be managed by men of business ability who possess the proper educational qualifications. It is not perhaps necessary for the general milk supply to conform to certified standards in all their minutiae. Dr. North's work has indicated this. But it should conform to a much higher standard than it does at present, one comparable to that by which other foods are judged and it should command a higher price. Even so it will still be an economical food. "The food value of a quart of certified milk cannot be duplicated for 15 cents by any other combination of foods obtainable in the market."

So the next campaign must be one to educate the public to demand purity in their ordinary milk and to realize that to get wholesome milk they must pay an adequate price.

## ORIGINAL COMMUNICATIONS.

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### SOME UNUSUAL CASES OF NARROWING OF THE ESOPHAGUS IN CHILDHOOD.

BY JOHN LOVETT MORSE, A.M., M.D.,

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I have been unfortunate enough to have seen, during the past year, 3 cases of the very rare condition known as congenital imperforation of the esophagus. The symptomatology was so similar in all that I will describe but one of them. This baby seemed normal at birth, except that there was a considerable amount of mucus in the nasopharynx. When first put to the breast he at once choked up and the throat seemed to be full of mucus, so much so that the nurse said that the mucus "met the milk." The story of each nursing was the same. He took hold, sucked and swallowed well, but after a minute or two strangled and everything came up. He had the same trouble with water which was given with a dropper. The nurse was sure, however, that he had taken more milk than he had vomited up. The stools had consisted entirely of meconium and he had passed but little urine. He had lost much weight and strength at the time he was seen, when five days old.

The physical examination showed nothing abnormal, except loss of weight and strength and the general signs of malnutrition. He was put to the breast and sucked rather feebly for several minutes. He then began to strangle, coughed and became moderately cyanotic, after which he vomited up a little milk mixed with mucus. He was then held upside down and two or three teaspoonfuls of milk and mucus ran out of his mouth. He was then perfectly comfortable. He was then given three dropperfuls of water, which was followed by strangling, coughing and vomiting as before. A No. 11 catheter was passed in 10 cm. from the gums without any difficulty, when it stopped short. The same thing happened when a smaller catheter was tried. The distance from the gums to the cardia in the newborn is 17 cm.

\* Read at a meeting of the New England Pediatric Society, May 11, 1912.



A stool, which was seen, was small and consisted entirely of meconium.

The history and physical examination are exactly what would be expected in an imperforation of the esophagus. The first symptom noticed in all the cases was an accumulation of mucus in the nasopharynx. This should always suggest the possibility of an obstruction in the esophagus, even before the appearance of vomiting on taking food. The nurses were sure in all the cases that the babies had taken much more food than they had vomited. In one instance the nurse was positive that the baby had retained several feedings at a time without vomiting. When this condition is suspected, therefore, no reliance should be placed on the history of retention of food, but the esophagus should be at once examined.

An autopsy was obtained in one case. This showed the usual malformation in this condition. The entire lumen of the esophagus ended sharply in a blind pouch about one-third of the distance downward from the epiglottis. Beyond this, a fibrous band extended downward for two cm., at the end of which the esophagus gradually reappeared just before reaching the cardiac orifice of the stomach. The lower section of the esophagus was connected with the trachea, just above the bifurcation, by means of a small opening, about 0.5 cm. in diameter. The meaning of this opening and the origin of the deformity are obscure.

The outlook in this condition is absolutely hopeless. It is, of course, possible to do a gastrotomy and keep the baby alive for a time by pouring the food directly into the stomach. This procedure can only delay the fatal termination, however, as there is no possibility of doing a plastic operation on the middle of the esophagus in babies of this age.

It is probable that the following cases were congenital in origin, although there is no proof of it. There was, at any rate, no history of esophageal trauma in any of them.

Charles V. was nursed for six months. He vomited occasionally when on the breast. He was given solid food when about a year old, after which he began to have periods, of a few weeks in duration, during which he would vomit almost everything soon after eating. These attacks had continued. He had never been able to retain meat. He had, however, not attempted to take it for a number of years. He had always retained liquids better than soft solids. There had never been blood in the

vomitum or any food eaten at previous meals. He was constipated until he was eight years old, since when his bowels had moved daily. He was admitted to the Children's Hospital when eleven years old. His diet during the two months previous was as follows:—

Breakfast—Strained Quaker oats and milk.

Dinner—One pint of milk beaten up with one egg, and a few crackers.

4 P.M.—A cup of milk with a slice of bread.

Supper—Thin soup and bread.

He had been vomiting more constantly for some time and had lost weight noticeably.

He was well developed, but poorly nourished. His color was fair. The physical examination showed nothing abnormal. He weighed forty-one pounds.

He was given the regular house diet for three days and vomited practically everything taken, including water between his meals. The vomiting always occurred within fifteen minutes after taking food. He also sometimes vomited water and mucus between feedings. He vomited noiselessly in successive gulps and apparently without gas. The reaction of the vomitus was the same as that of the food taken. It never showed free hydrochloric acid. An attempt was made to determine by auscultation of the epigastrium whether liquids ingested entered the stomach or not and, if so, how long it took them to reach it. At one time a squirting sound was heard twelve seconds after swallowing, but on several other occasions nothing whatever was heard. The normal time at his age should be five or six seconds.

It seemed evident from the time and character of the vomiting, the absence of hydrochloric acid in the vomitus and the delayed or absent sound over the stomach that there was a narrowing of the esophagus. It was thought from the history that there might also be some spasm in addition. He was, therefore, given small quantities of whey or olive oil every hour. These were retained without difficulty for three days. He was then given one feeding of finely chopped meat, which was at once vomited. He was unable to keep down the whey and olive oil during the next twenty-four hours, but then retained them and peptonized milk well, showing that the obstruction was only partial.

The accompanying Roentgenographs show a dilatation of the esophagus above a stricture about one-half way down, at the level of the eighth dorsal vertebra. Plates I. and II.

Frank G. was well up to the age of two years, when he had the whooping-cough, in which he had frequent attacks of vomiting. He had had recurrent attacks of vomiting, lasting for weeks at a time, since then. At the beginning of an attack he would



PLATE I.



PLATE II.

vomit solid food, but would retain liquids. After a few days he would vomit liquids and finally retain nothing. He would then gradually improve and get back to his usual routine. He would never, however, even between attacks, swallow hard solids like meat, but swallowed bread after chewing it thoroughly, and soft solids without difficulty. The vomiting always occurred immediately after taking food. Food which was not vomited within a few minutes after it was taken was retained. He never vomited any food which had been taken some time before or which had become decomposed. The bowels were constipated during the attacks, but at other times the stools were normal. When seen in consultation, when six years old, he was in the

midst of the most severe attack that he had ever had, having retained practically nothing, even water, for a number of days.

He was thin and pale. The physical examination was otherwise entirely negative. There was no evidence of any new growth or of pressure within the chest. He was constantly asking for water. He would take about 2 ounces eagerly and then vomit it up immediately with considerable retching. He would grab the glass again, take another 2 ounces, vomit it up, and so on. When water was swallowed, gurgling could be heard to the left of the spinous processes as far down as the sixth dorsal spine. It should normally be heard to the seventh or eighth. Nothing could be heard entering the stomach. An adult stomach tube was easily passed in 18 cm. from the teeth, where it met an obstruction and could be passed no farther. The distance from the incisor teeth to the cardia at this age is approximately 27 cm. Water poured into the tube was promptly vomited and evidently did not reach the stomach.

There was evidently a narrowing of the esophagus about 10 cm. above the cardia. The permanent inability to swallow solid food pointed strongly to an organic constriction, the intermittance of the symptoms to spasm. The most reasonable explanation of his case seemed to be that he had always had a certain amount of organic constriction, that the obstruction had at times been increased by spasm and that the organic constriction had finally increased so much that it practically obliterated the lumen. The lack of all evidences of new growth or pressure within the thorax made it very improbable that the constriction was due to pressure from the outside.

The accompanying Roentgenographs show the location of the narrowing in this instance. Plates III. and IV.

Arthur N. was nursed for sixteen months and did not vomit during this time. He began to regurgitate frequently, however, as soon as he was given solid food. The regurgitation gradually increased, so that after a time he began to regurgitate liquids also. He sometimes regurgitated everything he swallowed for a period of two or three days and never went more than twenty-four hours without some regurgitation. He apparently felt no nausea, but spit up his food without effort. He had never been known to regurgitate the food of one meal after the succeeding meal had been taken. The regurgitation usually appeared within a minute after swallowing. The food was brought up entirely



unchanged. He always knew when he was going to vomit. A No. 26 French bougie was passed in the surgical out-patient department of the Children's Hospital, June 27, 1911, and again July 15, 1911. He was admitted to the Children's Hospital, on the surgical side, February 7, 1912, when three years old. A No. 37 French, olive-tipped bougie (diameter=12.3 mm.) was passed down the esophagus 35 cm. without meeting any obstruction. This must have passed into the stomach. He was transferred to the medical side, February 12, 1912.



PLATE III.



PLATE IV.

He was a well-developed, rather thin boy, of fair color. The physical examination showed nothing abnormal. He weighed 25 pounds, the average for three years being 34.9 pounds. Auscultation of the stomach showed that the food passed into the stomach within the normal time limit. A stomach tube, 0.8 cm. in diameter, was passed into the esophagus 43 cm. from the front teeth without meeting any unnatural resistance. This tube must, of course, have entered the stomach and been rolled up in it, the normal distance from the incisor teeth to the cardia at this age being not more than 23 or 24 cm. When in the hos-

pital he was given only liquids and soft solids, except on one occasion when he was given a little finely chopped meat. He sometimes went several days without vomiting at all. At other times he would vomit once a day; at others, two or three times a day. He usually vomited, however, only a small portion of what he took. The vomiting almost always occurred within a few minutes after eating. The amount of the vomitus was at times apparently more than enough to fill the esophagus. The vomitus sometimes contained free hydrochloric acid. He had no fever



PLATE V.



PLATE VI.

during his stay in the hospital and weighed a little more when he was discharged, February 20, than when he was admitted.

It was evident in this instance that there could be no organic stricture of the esophagus of cardia.

The accompanying Roentgenographs show no dilatation or local narrowing of the esophagus. They do show, however, a shadow the whole length of the esophagus where there should not be one. The greater part of the bismuth has, on the other hand, entered the stomach. A reasonable explanation of the symptoms, therefore, is cardiospasm. Plates V. and VI.

Elliot R., five and one-half years old, was the only child of

extremely neurotic parents. They lived on an isolated farm, where he saw no other children and very few adults. He was nursed for fifteen months, but did not thrive very well. Much trouble was experienced in finding anything to agree with him after he was weaned. He was given Horlick's Malted Milk with water until he was two years old, when he was given strained oatmeal with milk and sugar. About six weeks before he was seen, a raw egg was added to it. He was taking, when seen, two feedings a day, getting in all two-thirds of a pint of oatmeal gruel, one pint of milk and a raw egg daily. His mother said that she had to stand over him with a strap to get him to take this amount. She said that she could not make him swallow any kind of solid food and that he always vomited it as soon as he took it. When asked why he did not eat solid food the boy said because he didn't like to. He was easily tired, had night terrors frequently and wet both the bed and his clothes. He drank water freely and was never constipated. He had had a large variety of tonics on the advice of his grandfather, who was a drug-gist's clerk.

He was fairly developed and nourished, but a little pale. He was intelligent and did not appear especially nervous. The physical examination was otherwise normal. His weight, with his clothes, was 38 pounds, the average for his age being 43 pounds.

He was admitted to the Children's Hospital and during his stay of three days ate the regular house diet, which contains meat and bread, without the slightest difficulty and with apparent enjoyment.

The Roentgenographs showed no evidence of narrowing of the esophagus. There was, however, a very slight shadow of bismuth the whole length of the esophagus, which suggests that there may have been, in this case also, a slight amount of cardio-spasm. The more probable diagnosis is, however, hysteria.

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SALVARSAN THERAPY OF SCARLATINA.—Klemperer (*Deutsch. med. Woch.*, May 9th) reported to the German Congress for Internal Medicine on the intravenous use of salvarsan in an epidemic of scarlatina with a mortality of nearly 25 per cent. The mortality in the salvarsan series was about 8 per cent. In every case treated the injection was followed at once by a fall of temperature, a phenomenon never seen in any of the forms of sepsis, rheumatism, or tuberculosis.—*Medical Record.*

## THE TREATMENT OF SCARLET FEVER.\* 493

BY LOUIS FISCHER, M.D.,

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It is impossible to lay down specific rules which will apply to all cases of scarlet fever. One case begins with mild symptoms and continues its mild course throughout the duration of the infection. Another case begins with septic manifestations and symptoms indicating an overwhelming amount of toxin which requires heroic treatment, hence one is compelled to study and individualize each and every case to be successful. The principal aim in treatment should be the prevention of complications, if such is at all possible.

Rest in bed for at least five or six weeks is imperative, be the case mild or severe. This rest in bed will prevent nephritis, will also support the heart, and in a large measure prevent cardiac complications. Allowing the child out of bed after fever subsides during the first week or ten days of illness is responsible for many fatal complications, especially of the lungs and ears.

It is our duty to impress on the laity that rest in bed means the prevention of complications. Uniform warmth, especially after desquamation, is demanded. The skin is hypersensitive and chilling the surface invites re-infection.

*Elimination of Toxins.*—Elimination of toxins through the three emunctories—the skin, the kidneys and the bowels—is of the greatest importance. The toxin of scarlet fever does not stimulate peristalsis, but rather paralyzes the same, hence the daily administration of a teaspoonful of cascara elixir alone, or assisted by a soap water enema, should be a daily routine performance. The toxin of scarlet fever disturbs the secretion of the kidneys, hence it is advisable at the very beginning of the treatment to give a 10 to 15 grain dose of citrate or bi-tartrate of potassium, in addition to a little lemonade to stimulate diuresis, several times a day. These two emunctories are the main channels for eliminating toxins which cause fever, and besides interfere with the proper function of the various glands. We must not permit stagnation of toxins in the body, hence in septic

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cases active catharsis must be maintained and calomel or podophyllin should be given each day. High colonic flushings with 1 dram of inspissated oxgall added to 1 pint of tepid water will produce thorough intestinal cleansing.

The toxin inhibits the internal secretions. Because of this condition, the ductless glands, the adrenals, and the thyroid do not functionate. I have seen excellent results follow the internal administration of adrenalin as well as thyroid.

*Fever Treatment.*—Seek the cause of fever. Do not use antipyretics, they depress the heart and mask symptoms, and disturb the clinical picture. If pyrexia causes delirium, a hot mustard bath will allay irritability. If convulsions appear lumbar puncture should be employed to relieve intracranial pressure. Draining 10 to 15 c.cm. of spinal fluid is very soothing in prolonged cerebral irritation, and relieves nervous manifestations, *e.g.*, twitching.

The temperature can be reduced by laxatives such as citrate of magnesia, which, in addition, is a good diuretic and quenches thirst. In a case of hyperpyrexia due to a severe infection a rapid means of reducing temperature is to wash the colon with one quart of tepid saline solution.

*Prophylactic Measures.*—Pathogenic bacteria persist in the lacunæ of inflamed tonsils for many days and weeks. The use of a 5 per cent. formalin spray in the nasopharynx will frequently destroy such organisms.

This treatment must be continued several times a day throughout the disease if we wish to prevent reinfection. The installation of a few drops of a 5 per cent. formalin solution into the nostrils twice a day is useful as a prophylactic early in the disease.

By careful nasal spray or instillation we need not fear entering the Eustachian tube. The frequent complication of diphtheria with scarlet fever demands earnest attention. In a series of observations made at the Willard Parker hospital we have found that the routine method of administering to each and every case of scarlet fever, on admission to the hospital, 1,000 units of antitoxin has reduced the complication of diphtheria by at least 25 per cent. If, however, in spite of this prophylactic injection, nasal, tonsillar, or laryngeal diphtheria develops, then an injection of an additional 5,000 units should be given, and this dose of 5,000 repeated, if necessary, in twelve hours. If in a severe scarlet fever the odor of necrosis is present, then 5,000

units should be injected in the beginning of treatment, regardless of the presence of the Klebs Loeffler bacillus. Anaphylactic shock should always be remembered when employing large doses of antitoxin.

*Croup.—Laryngeal Stenosis.*—When this complication arises the same treatment—5,000 units of antitoxin plus intubation for the relief of the stenosis—may be demanded. Great caution must be used in introducing the tube lest we produce ulceration or even false passages by applying force. Decubitus may follow traumatism during intubation or extubation.

*Nasopharyngeal Irrigation.*—Loose necrotic patches and post-nasal discharges are a source of danger to the Eustachian tube. One must always bear in mind the ease with which pathogenic bacteria can enter the middle ear through the pharyngeal opening of the Eustachian tube. It is important to wash the nasopharynx with a normal saline solution morning and evening or oftener, because there is great danger of infecting the Eustachian tube. Following such washing the installation of Dobell's solution or 20 per cent. argyrol solution will disinfect the nasal passage and in some cases prevent aural complications:

*The Ears.*—Daily examination of the middle ear should be made, thus can otitis be recognized early, and a congestion or bulging given early treatment, before an extension into the mastoid cells has developed.

*Mastoiditis.*—Excepting in rare instances, I am not in accord with the too prevalent idea of operating on the mastoid for ordinary mastoid tenderness. A free incision into the drum is sufficient, as a rule, to relieve the tension of an acute otitis media. If such tension is not relieved and bulging persists, then another paracentesis should be performed, and thorough drainage thereby established. The external application of a hot-water bottle or a hot poultice will frequently aid in aborting mastoiditis. The ice bag and ice coil have given me no satisfaction.

*Cervical Adenitis.*—When such complication exists, then a careful inspection of the nasopharynx and the middle ear should be made. This is necessary so that we can exclude such complication before treating the glands. A warm flaxseed poultice and the daily inunction of compound iodine ointment rubbed thoroughly into the glandular tissue once daily has proven effective in very many cases. The above treatment applies only to hard, swollen non-suppurative glands.

*Vulvovaginitis.*—Catarrhal discharges due to the strepto-

coccus and the gonococcus will be a source of serious annoyance during the course of scarlet fever, and demand strict hygienic measures, otherwise there is danger of infecting the eye. A case of gonorrheal ophthalmia was recently seen by me at the Willard Parker Hospital in which blindness followed the infection. The installation of a 20 per cent. nitrate of silver solution, by means of a medicine dropper, once, in the vagina, is usually sufficient to destroy the gonococci. For cleansing the parts I advise a solution of powdered alum 1 dram, borax 1 dram, and 1 pint of tepid water, to be douched morning and evening.

*Vaccine Therapy.*—The injection of 50,000,000 to 100,000,000 gonococci in the form of a vaccine has been tried by me in the treatment of vulvovaginitis. While in some isolated cases the discharge lessened, gonococci persisted. In cases of multiple furunculosis due to the staphylococcus almost specific results followed an autogenous vaccine injection of 50,000,000 to 150,000,000 bacteria. But in no other infection was this specific effect of vaccine therapy apparent.

*Serum Therapy.*—There is no specific serum in use today, because neither the etiology nor the bacteriology of this disease is understood, and yet the presence of streptococci in the throat and in many of the discharges lends color to the supposition that it is the causative factor.

Moser's antistreptococcus serum showed specific effects in some cases within twenty-four to forty-eight hours after one injection at Escherich's clinic. This was the case with antistreptococcus serum as well as streptolytic serum made in this country. No specific action could be traced to these serums. Complications arose just as before.

*Erysipelas Complicating Scarlet Fever.*—The local treatment with Burrough's solution, or the use of a 20 per cent. aqueous ichthyol solution is good in some cases. I have seen excellent results from the use of the application of pure alcohol, the saturated gauze being covered with oiled silk. The supersaturated solution of magnesium sulphate is very successfully used at the Willard Parker hospital and is worth recommending.

*Pertussis.*—When pertussis complicates scarlet fever, large doses of codein should be given—one-eighth to one-fourth grain every three hours for a child one to two years old. If older, then one-fourth to one-third or even one-half grain repeated every three hours has relieved the paroxysms, and induced sleep. A plaster support to the ribs will modify the cough, if applied very



snugly. When codein fails, sodium bromide combined with chloral hydrate may be tried.

*Measles.*—No complication is dreaded more than measles, because of bronchopneumonia, croup, otitis and empyema supervening. Exposure to cold draughts in bronchopneumonia ends fatally. Warmth or moderate temperature are well borne. Dry cupping and warm moist fomentations soothe and relieve pulmonary congestion. Small doses of Dover's powder are useful. Active catharsis relieves toxemia. Warm demulcent drinks are indicated.

*Nephritis.*—Daily supervision of the urine will be the guide for an early diagnosis of acute renal congestion, and show when nephritis develops. Suppression of urine demands the application of dry cups twice a day, followed by a warm bath at the temperature of 102° to 104° F. for about two minutes, after which the patient should be wrapped in a warm bath towel and covered by warm blankets. A cup of warm tea or hot lemonade will stimulate both diuresis and diaphoresis. This active treatment should be repeated every twelve hours until acute suppression subsides.

*Diuretics.*—Agurin, diuretin and theocin, 2 to 5 grains, for a child three to five years old may be given three times a day.

The salt-free diet, so plausible in theory, is not proven useful in practice. I could not convince myself of the absolute value of salt-free diet in any one case.

*Pneumonia.*—The most frequent type of bronchopneumonia, or even lobarpneumonia, complicating scarlet fever is best treated by placing the patient in a large room with plenty of fresh air, avoiding draughts. *When placed out of doors they do badly.* The depressing effect of scarlet fever lowers the vitality, and such cases succumb easily when exposed out of doors. *Hence roof treatment is dangerous.*

*Empyema.*—Paracentesis to relieve the purulent exudate. Avoid the shock of an operation. Remember that part of the elasticity of the thorax is wanting when ribs are excised. Call the surgeon early in the disease. If possible local anesthesia should be used.

*The Heart.*—The supervision of the heart in scarlet fever must be constant. The toxin carried through the blood current devitalizes the blood itself, weakens the heart muscle and causes a general toxemia. Myocardial insufficiency can be avoided by judicious diet and continuous stimulation.



*Stimulation.*—Strychnin should be given early in the disease. My plan is to stimulate *before the heart shows weakness*, and continue this plan throughout the disease. Caffein sodium-benzoate one-half grain every two or three hours is an excellent diffusible stimulant. Digitalis, owing to its cumulative effect, is a dangerous drug. Digitoxin, sold in the drug stores as digalen, in 5 to 10 drop doses, three or four times a day, will support a weakened heart. Whiskey in very small doses, 5 to 15 drops, when required. Dram doses irritate the gastric mucosa and may in a susceptible child cause delirium. In large doses it is especially irritating to the kidneys. The indiscriminate use of whiskey as a routine treatment should be condemned. Much better results will be obtained by an injection of 10 to 20 drops of a 1 to 1,000 adrenalin solution, repeated every hour until proper effect is noted. This adrenalin is more rapid in effect than digitalis or digitoxin.

No organ of the body requires stricter supervision than the heart. The temperature will be found of no service in estimating a cardiac complication. The presence of muffled heart sounds or a bruit are indications of impending cardiac weakness.

When symptoms of collapse are noted the injection of 5 to 15 drops of camphorated oil (20 per cent. camphor in oil) will prove beneficial and should be repeated until the desired effect on the heart is noted.

*Feeding.*—Remembering that the peptic glands do not functionate properly, we must reduce the fat and casein content of the food to less than the normal patient requires. My rule is to give milk diluted with an equal quantity of water, sweetened whey, or fat-free milk fermented with the Bulgarian bacillus. This Bulgarian milk is very digestible, and owes its digestibility to the casein lactate. Besides its nutritive value it also has a slight laxative property. In cases in which milk is not well borne, vegetable proteid in the form of split pea soup may be tried. Liberal quantities of water should be given. Likewise the fruit juices. Orange, pineapple, lemon and grape juice may be given with advantage. This light diet should be used until the acute febrile process subsides, generally after one week.

After convalescence is thoroughly established we may give whole milk or sufficient of the carbohydrates, such as well steamed farina, tapioca, or cornstarch pudding to be made with milk and sugar, but without eggs. Meat is too stimulating and should be excluded from the dietary.

## THE ADMINISTRATION OF BICHLORID OF MERCURY TO THE MOTHER, FOR ITS EFFECT UPON THE DIGESTIVE FUNCTION OF THE NURSING.

BY SIDNEY V. HAAS, M.D.,  
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The diversity of opinion regarding the value of bichlorid of mercury when administered to the mother for effect upon the nursing is well exemplified by the following:

Peligot,<sup>1</sup> Chevallier, Henry, Harnier,<sup>2</sup> Kahler,<sup>3</sup> Somma<sup>4</sup> and others, deny that bichlorid of mercury is excreted by the mother's milk, or that any clinical effect can be obtained by such use.

Somma carried out in the Pediatric Institute of the Royal University of Naples, seven experiments upon the milk of six women. In one instance the mercury was administered hypodermatically, the woman receiving 0.06 of bichlorid of mercury in twelve days, namely: an injection of 0.01 every other day. In all the other cases the mercury was administered by means of inunctions of Napolitan mercurial ointment in an average dose of 1.00 or more daily. The lowest number of such inunctions was five; the highest thirty.

The milk of these women was obtained every day, and analyzed on the same day; not only during the entire period of mercurial treatment, but for ten to fifteen days after the treatment had been stopped.

The result of these investigations was absolutely negative. Not even a minute trace of mercury having been demonstrated in any of the seven cases.

Accordingly, Somma feels justified in concluding that the administration of mercurial preparations by the indirect way of the mother's or nurse's milk to nursing infants suffering from congenital syphilis is not a therapeutic method for the clinician to rely upon, inasmuch as mercury is not eliminated by the mammary secretion.

On the other hand, according to Roger,<sup>5</sup> mercury is eliminated through the mammary gland, but in an inconstant and variable manner, so that no therapeutic application may be based upon this property.

Schling<sup>2</sup> noted that mercury was transmitted to the milk in but small quantities and irregularly.

Brunton<sup>6</sup> states that mercury passes into the milk, and may be given to the mother to be effective for the child.

Lewald<sup>7</sup> finds that the excretion of the mercury in the milk is undeniable, and the treatment of syphilitic children by the administration of mercury to the mother has a rational basis.

J. Nega<sup>8</sup> states that mercury is found in the milk.

Sigalas and Dupony,<sup>9</sup> actuated by the paper of Somma, experimented for the purpose of determining its elimination through the milk. The investigations included syphilitic wet nurses, who had long been under mercurial treatment, and a woman and a goat who had not previously been treated. The results were positive in the first series; negative in the cases of the woman and the goat, who never before had been given mercury, although the milk was examined daily for thirteen consecutive days. They conclude that mercury must be included among the toxic and medicinal substances which are eliminated through the mammary gland, although there is a delay in this elimination which may explain why other experimenters have failed to find it.

Among the many others who believe that mercury is eliminated by the mammary gland, may be cited: Notlmagel and Rossbach; Bristow and Seward; Schoenstein, Labourette, Binz, Orfila and Klink. And those who like Daumond, Assolini, Columbier, Lebreton, Simon and C. West, basing their conclusions upon clinical findings, recommend this indirect method of treatment particularly in the lighter forms of hereditary syphilis.

Prompted by these antagonistic opinions, I began eight years ago to test its value in the treatment of congenital syphilis among the cases occurring in the pediatric service of Professor Holt at the Vanderbilt Clinic. It was found that the effect upon the specific process, though positive, was slight, whereas, gastrointestinal and nutritional disturbances when present, cleared up in a most remarkable manner.

By way of illustration: An infant six weeks of age, anemic with marked desquamation, rugae, snuffles, large liver and spleen, birth weight  $6\frac{1}{2}$  pounds, present weight 7 pounds, has had numerous green mucous stools since birth, although breast fed. The mother was given bichlorid of mercury,  $\frac{1}{32}$  of a grain, three times a day; when seen forty-eight hours later, the stools were



yellow, no mucus, the syphilitic process unchanged. After a week, however, this too showed slight improvement. A gain in weight of a half pound was registered. No other changes had been made in régime of mother or infant.

After noting the regularity with which this occurred in cases suffering from congenital syphilis, it was decided to test its value in gastrointestinal disturbances among nonspecific nurslings.

The result was most encouraging. Between 35 and 40 per cent. of the cases were benefited; no harm resulted even in those cases which were not improved. The drug was administered in more than 200 cases.

The dose, excepting in the earlier cases, was tablet triturate of bichlorid of mercury,  $\frac{1}{32}$  of a grain, administered to the mother three times a day after meals. It is possible that larger doses might have given good results where none were obtained.

The cases were not selected. Any nursling not prospering was considered a good subject.

The effect upon the mother of a syphilitic child was positive, rapid and striking, the general tone and color improving visibly.

Upon the nonspecific mother the effect was sometimes that of a general tonic, but in most cases no effect was observed. In a few cases the mother lost weight. The effect upon the quantity of milk supplied, according to the statements made by the mothers, varied within wide limits. Usually there was an increased secretion; in some cases no change, and in a few cases a distinct diminution in the supply. The quality of the milk would appear to have been improved, if one may judge by clinical results. For, owing to the great variation in the constitution of milk drawn at the beginning or at the end of nursing, or at different periods of the day, or under varying physical or mental states, the chemistry of the subject was not considered, as outpatient practice, in which most cases were seen, does not permit of the careful methods which alone could make such observations of value.

In a number of instances, where, under poor advice, nursing had been discontinued, and the milk had practically disappeared, it was possible to re-establish the function, in one case, after twelve weeks. It seemed that the mercury was of some assistance in these cases, although this is not at all certain, since we know that the function can be re-established by simply permitting nursing to be resumed.



Note was made of the effect upon the child's

General condition:

Weight:

Vomiting:

Diarrhea:

Constipation:

Colic:

Skin manifestations.

The general condition in specific cases improved at once and markedly. Reference is not made here to syphilitic lesions. In the nonspecific cases improvement occurred, but not suddenly nor in striking degree. Where a sudden or striking improvement occurs, it is possible that the case is specific, without a history. In two instances, upon communicating with the father, it was possible to prove this.

The *weight* improves very rapidly in many cases; usually, however; there is a normal increment where weight has been stationary, or was being lost. In several cases, by stopping the treatment, the weight became stationary, to advance again with the resumption of the drug.

This is illustrated by the following case:

H. B., ten weeks old, breast fed; tendency to constipation; stools are green; there has been no gain in weight for two weeks. Three days after the administration of  $\frac{1}{32}$  of a grain  $\text{HgCl}_2$  three times a day to the mother, baby had gained 2 ounces; the stools were better color and moved daily; at the end of ten days there had been a gain of 7 ounces in weight. When the medicine was exhausted, it was not renewed for a week; child again became constipated, and the weight once more became stationary until treatment was renewed.

*Vomiting* stops within twenty-four hours, and this result was quite regular. It does not seem to matter what the cause of the vomiting is, so long as it is not due to organic causes, *i.e.* (obstructive), nor produced by overfeeding.

A striking case illustrating this is the following:

Baby R., two months old, premature; at eight months, because of renal disease of the mother. The case is one of true milk poisoning; cow's milk in any form producing the symptoms of acute irritant poisoning. This is still true at the end of three years. The mother being unable to nurse, a wet nurse was procured. The baby vomited constantly until mercury was ad-

ministered to the nurse. This was stopped after a few weeks, and vomiting began again, to be again relieved by the administration of mercury.

*Diarrhea.*—The movements became less numerous, and undigested, green, curdy, mucous, foul smelling stools began to be replaced by those of normal appearance, and these without any other change in régime, and without administering a cathartic, to the baby.

*A Case.*—June 24th. W. T., five months. W+13<sup>5</sup> diarrhea for three days, six to eight green mucous stools containing curds. HgCl<sub>2</sub> administered after forty-eight hours, three stools green and yellow, little mucus, some curds. Loss W+5 ounces.

After another forty-eight hours stools yellow and normal, W+13<sup>2</sup> having regained 2 ounces in the last two days. Nursing was not stopped, no other treatment.

*Constipation* existed in a number of instances and was relieved very promptly. Several mothers were able to regulate the number of stools of the infants by the number of tablets of mercury which were taken.

An example of this:

William R., six weeks old, birth weight 10 pounds. The weight upon first examination was 10 pounds, 9 ounces. There is marked intertrigo. Breast does not seem to satisfy; cries after nursing and does not seem to gain much in weight; has much colic. Four days after the beginning of the mercury, child seemed better satisfied, and there was no colic. One week after the beginning of the treatment the child weighed 11 pounds, 5½ ounces; the intertrigo almost gone. At the end of seven weeks the baby weighed 14 pounds, 10 ounces, a gain of 65 ounces in forty-nine days. The mother reports that the stools are excellent in quality, but have been exceedingly numerous; when she takes one tablet a day the child has two movements; when she takes two tablets there are four and five movements, and if three tablets are taken daily, the child has diarrhea.

*Colic.*—Excepting weight, this was benefited more regularly than any other symptom, and especially when it existed without any apparent indigestion, vomiting or diarrhea.

An illustrative case:

E. H., six weeks old, W+11<sup>7</sup>; it vomits; the character sometimes being projectile; has a great deal of colic and is constipated. It has been fed every two hours for twenty minutes; the

feeding was ordered to be made every three hours for ten minutes; vomiting ceased, but colic and constipation persisted; bichlorid was then started; within forty-eight hours the bowels began to move twice daily; colic had almost disappeared. After two weeks the mercury was discontinued; constipation once more ensued, and the child cried constantly with colic. With the resumption of the mercury, the bowels began again to move spontaneously, with disappearance of the colic. The weight, forty-one days after beginning treatment, was 10 pounds, 12 ounces, a gain of 49 ounces.

*Eczema.*—In a few cases was improved at once. Urticaria seemed also to have been benefited.

It is rarely necessary to continue the use of the drug in this manner, for more than four weeks, although in a few cases it was necessary to continue the use of the treatment for months.

How the beneficial effect is obtained cannot be positively stated. That it is due solely to the mercury present in the breast milk, is difficult to believe, in view of the fact that it cannot be demonstrated chemically, within a number of days of the beginning of its administration. Whereas, the benefit experienced by the nursing, occurs usually within the first two or three days.

Far more likely that it has a specific action upon the mammary gland as it has upon other glands of the body, and that this action, combined with its general tonic effect upon the mother, produces an improvement in the quality of the milk.

The mode of action of bichlorid of mercury is perhaps best explained by Bartholow,<sup>10</sup> that mercury has a selective action upon the lymphatic glandular system, and notably on the pancreas and salivary glands. It is to some extent a chologogue, increasing the production of bile, and as its stimulating action must include the glycogenic function as well, it may be supposed that its tonic and reconstituent effect is thus produced. If we add to the chologogue properties of mercury the action on the pancreas and the increased elimination of the products of waste by the intestinal glands, we obtain a satisfactory explanation of those powers which have under the term alterative been heretofore ascribed to bichlorid of mercury.

According to Chittenden,<sup>11</sup> the form in which mercury is eliminated from the body is probably that of an albuminate.

Fonsagrives<sup>12</sup> states that the mercury which circulates in the

blood in combination with the albumen is found in the milk, in combination with the same substance:

The literature shows nothing of the use of the mercury in this manner for this purpose.

All authors on therapeutics, however, agree as to the almost specific effect of mercury, either the bichlorid or the chlorid upon the gastrointestinal disturbances of infants and children when given by the direct ordinary method.

#### CONCLUSIONS.

Bichlorid of mercury, administered to the nursing mother, has a decided effect upon the gastrointestinal condition and nutrition of the nursling.

It is efficacious in a sufficiently large percentage of cases, to make it of value as an addition to the therapy of this condition.

It is indicated in any gastrointestinal disturbance of the nursing, as it has thus far proved harmless, even when it failed to benefit. It is not a specific, but it is one of the very few drugs capable of influencing the metabolism of the mammary gland.

In specific cases, accompanied by gastrointestinal disturbances, the drug administered in this manner is probably specific in its action upon such process, although the other usual manifestations of syphilis are improved only in slight degree.

The mother of a syphilitic child should be permitted, and even encouraged, to nurse her child, bichlorid of mercury being administered to her the while.

Digestive disturbance in nursing infants would appear to be benefited in between 35 to 40 per cent. of cases by the administration of  $\frac{1}{32}$  grain of bichlorid of mercury administered to the mother three times daily after meals.

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## SOME COMMON ERRORS IN DIET AFTER THE FIRST YEAR.

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Probably half the children between the ages of one and five years that come to the physician for treatment have the diet to account for their condition. The ignorance of the laity upon this subject and the mistaken ideas of many medical men are the cause of this condition of affairs. During the second year when the child is changing from a period of infancy to that of young adult life, the subject of diet is of the utmost importance. Medical literature abounds in articles upon the feeding of infants during their first year, perhaps, because the theories of infant feeding are very varied and not as yet thoroughly settled, but very little is said about the diet of children during their second and third years.

One of the chief errors which I believe is common both to the leading pediatricists and the physician in general is the too frequent feeding during the second year. Almost any text-book that you will read upon the subject gives at least five or six meals at this age, and this I believe to be a great mistake. As soon as the child has become old enough to take solid food, the frequent feedings cause digestive disturbances. The child loses his appetite and is not as well nourished as he would be if he were fed upon three meals a day just as the adult is. Holt gives a dietary which allows five meals a day throughout the entire second year. Rotch devotes about a third of a page to the subject without naming any definite dietary for this age. Koplik gives five meals a day until the end of the second year. Griffiths follows the same plan in detail. In fact, almost all the American authorities agree upon this subject. My first reason for not approving of these numerous meals was the fact that I have observed that so many of the children thus fed have poor appetites. They will take only part of the food offered to them and included in the various dietaries, and they never seem to be very hungry, so that it is difficult to get them to take any new articles of food. This is a very important matter because during the second year it is necessary to introduce into the dietary one new food after another, and from a practical standpoint this is im-

possible when the child is not hungry enough to eat. My plan, then, is to cut down the number of meals to three, after the fourteenth month, with the addition of a 10 P.M. bottle. At eighteen months this 10 P.M. feeding should be omitted.

Another grave mistake which I think is being made by many authorities in this country is the omission of vegetables during the first half of the second year. Holt says, "Potatoes and other vegetables are best deferred until the child is past two years of age," and other pediatricists seem to agree with him. From the theoretical standpoint this would seem to be wrong, since it is just at this age that the child needs iron which the vegetables contain. He has been fed upon a milk diet throughout his first year, and milk is very deficient in iron, and probably other necessary mineral constituents of the food. Theoretically, also, the infant is born with enough iron stored up, principally in the liver, to last him throughout the first year. From a practical standpoint, many children who are not given vegetables are anemic even though the diet has been most carefully regulated according to our American standards. It has been my custom, therefore, to give potatoes once a day and one other vegetable along with it, soon after the beginning of the second year. It is, of course, necessary to cook these vegetables thoroughly so that they are soft, and to mash them so that they contain no hard particles which, of course, a child at this age is unable to masticate because of his lack of teeth. I allow spinach, green peas, string beans, carrots, beets and asparagus tips.

Perhaps the next most frequent error is that of allowing too much milk during this period. Milk is a very good article of food for children and they should be allowed to have a certain amount of it each day. One milk meal a day is enough at least after eighteen months of age. Too much milk has the same effect as too frequent feedings. It is also the most frequent of all the causes of constipation. This is an error that the laity are much more apt to make than is the medical profession. It is not uncommon to see a child one and one-half years of age getting two quarts of milk in twenty-four hours. In older children it is often given to them with all of their meals, and in younger children a drink of milk is given as a beverage. Whenever the children become thirsty throughout the day they are allowed to partake of it instead of water, which is ruinous to their digestion.

The use of cereals is almost invariably overdone at this age.

It is a common custom to give cereals twice a day and some children get them even oftener than this. One cereal meal a day is enough at any age, but it is of more importance that no more than this should be given after the teeth have come. I believe that one reason why the teeth are not well formed and decay early in so many American children, is because they are not given enough solid food upon which to chew. The eating of mushy foods exclusively is the rule throughout childhood, I am sorry to say. The child gets into the habit of eating without masticating the food thoroughly since it can be swallowed without any chewing whatever, and in this way the American habit of rapid eating is acquired, in part at least. For this reason the bread should be put into the oven and thoroughly dried until it is hard. It should then be chewed without the aid of liquids to wash it down.

When the milk is given in lessened quantities it is necessary to furnish proteids in some form and this is best done at first by giving eggs. The eggs should be given first in small quantities; that is, only part of the egg, and the amount gradually increased until the child takes one egg each day. They should be coddled, soft boiled or poached for the sake of variety. Later on, after the teeth have all come, which is usually eighteen months of age, the proteids may be still further increased by giving meat once a day beside the egg. At this time, the 10 P.M. feeding of milk is discontinued so that the child has only one milk feeding a day, and therefore needs the extra amount of proteid contained in the meat. The meat should be cooked rare, either roasted or broiled, cut fine and mixed with the potato at first. Steak, chops, roast beef or lamb, hamburger steak, chicken and occasionally boiled fish, are allowed. Boiled meats are not permitted at first with the exception perhaps of chicken. Children who do not get the proper amount of proteid in the diet, are very apt to be large eaters, and consequently to overeat. Oftentimes this overeating is of foods which are more difficult to digest than the meat. There seems to be a widespread tendency not to give meat during the second and often during the third years. There is also a tendency, after five years of age, to give the child meat more than once a day, which I think is almost as bad as the entire absence of it.

Another inconsistency in the diet of children is in giving them soups. It has long been understood that soups and broths have little nutriment and contain only the extractives of meat.



The child who makes a meal of soup gets very little nourishment except for the bread or whatever else is eaten with it. It is difficult to see, therefore, why a soup should be advised in every dietary for children. They do not need a vehicle in which to take the bread or other carbohydrates, because all children eat these without any urging.

The place of fruits in the child's diet is a very important one. They help to regulate the bowels, and offer the other elements of the food which are very necessary. Why it is that uncooked fruits are not allowed I cannot understand, but such is the dictum of many pediatricists. Fruits are not any more easily digested when cooked and the custom of cooking them with sugar is a general one and I believe a very bad practice. From a practical standpoint, I have long given uncooked fruits even during the latter part of the first year, and I have never found that the well child had any difficulty in digesting them, if they were given properly. Of course, before the teeth have all come and before the child has learned to masticate thoroughly, they are indigestible if swallowed in hard pieces, therefore, until the end of the second year, it is best to give them scraped or mashed. A ripe apple or pear when scraped with a spoon is allowed once or twice a day, or even more if the bowels require it. Children are much more fond of fruits in this way, and they are much more digestible than prunes and other dried fruits which are usually advised for constipation.

Sugar is an article of food which probably causes more digestive disturbances than any other one thing. We sometimes hear it argued that children have a craving for sweets and that this craving should be satisfied. Those who come in intimate contact with children soon learn that their cravings are not a guide to their requirements. Sugar is a very concentrated kind of nourishment, and its high caloric value takes away the child's appetite from other foods which are necessary for him to take. Often children who have their diet carefully regulated particularly as they get older, get a certain amount of sweets in spite of any restriction that is put upon them. No matter how much we may say to the parents upon this subject, the sweets are always forthcoming. It is therefore my habit to limit sweet desserts to the noon meal, and if possible to prohibit them at all other times. The desserts may be given at the end of the second year and consist of rice-pudding, blanc-mange, gelatine puddings,



farina, soft and hard custards, sponge cake or lady fingers dry or with whipped cream, angel cake or sweetened crackers. Special care should be given to prevent the use of sugar upon the cereals or fruits, and, of course, candy between the meals or at any other time.

One of the difficulties that is first encountered is in getting the child to take the diet that is prescribed. There are many children who are made to eat solid food with great difficulty at the beginning of the weaning period. This is usually due to two mistakes. The first one of these is in not beginning to feed the baby with the spoon early enough. At nine or ten months of age, every child should learn to take water, milk or small amounts of cereal in this way so that he may learn to eat and acquire a taste for food. The second cause of this distaste for eating, is the excessive amount of milk that is given during the early part of the second year. Naturally the child who gets all the nourishment he needs from milk, will not care for any other food. In older children the matter of discipline enters into their taking the diet that is prescribed for them. Some children always seem to have a distaste for any new article of food. Such children must be made to take the general diet and taught to acquire a taste for new articles of food when they are offered to them. There are, of course, those children who want to eat everything that the adult eats, and are allowed to do so, but a discussion of such cases need not be included here.

In laying out a diet for a child, it is never sufficient to say that he may take this and may not take that, but each meal should be planned, and after inquiring into the habits of the family and of the time of the child's sleeping periods, the time of day for the meals should receive attention also. A very general error in prescribing a diet both in sickness and in health is to say what the patient should not eat, without giving something to take the place of the food which has been interdicted.

Variety in the diet is necessary because it is well for the child to have a relish for his food, but this variety may be given without changing the kinds of food. For instance, the bread itself may be varied with white bread, whole wheat bread, graham bread, rye bread, bran biscuits, and even crackers such as hard-tack, soda crackers, oatmeal crackers, graham crackers, egg biscuit, rice and arrowroot wafers. The cereals offer just as great a variety if care is taken to change them from day to day. Cream

of wheat, rolled oats, wheateana, grits, cornmeal mush, rice and hominy are all useful. In the same way the vegetables may be varied.

To be specific then, I would feed a child from one year to fifteen months of age in the following manner, provided he is of average weight, and has done well up to that time. At 7 A.M. cereal, milk and toast. At 11 A.M. eight ounces of milk in the bottle if he has been accustomed to taking the bottle. At 2 P.M. a baked potato, an egg and bread. At 6 P.M. and 10 P.M. eight ounces of undiluted milk from the bottle.

From fifteen to eighteen months, the child may eat at the family meal time with a bottle or eight ounces of milk at 10 P.M. For breakfast, a cereal with milk and no sugar, and a cup of milk and some bread. For dinner, a soft boiled, coddled or poached egg, a potato with one other vegetable, bread and fruit. For supper, milk and bread. Raw fruits in the middle of the morning and afternoon help to shorten these long intervals when the child is first unaccustomed to going so long without eating. At eighteen months of age, all the teeth have come through and meat is added to the noon meal, and the egg is given at breakfast time, omitting milk at that meal.

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THE LARGE FLACCID ABDOMEN IN INFANTS.—A. B. Marfan (*Archiv. de Méd. des Enfants*) distinguishes two types of large abdomen found in nursing infants; the tympanitic, which is hard, distended and sonorous on percussion, and the relaxed, which is soft, depressible and dull on percussion. The tympanitic abdomen is preceded or accompanied by diarrhea or severe constipation. The flaccid abdomen is accompanied by anorexia and dyspeptic symptoms that are not marked. The walls are thinned and atonic, and eventrations are seen between the recti and the lateral abdominal muscles. Measurements of the intestines have shown that they are much elongated and the walls thinned and atonic. It is this elongation and increase in size of the bowels that causes stretching of the atonic abdominal muscles. The condition occurs generally with the symptoms and deformities of rickets, and the author believes that the same causes that bring about rickets are responsible for this type of enlarged abdomen.—*Medical Record.*

## THE ADMINISTRATION OF ANESTHETICS TO INFANTS AND CHILDREN.

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Great strides have been made during the past twenty years in the administration of anesthetics. I remember sitting, in 1893, in a newly-completed operating theater and watching the junior of the house staff pour a quarter of a can of ether into an ether cone made of a towel and newspaper, clap it on the patient's face, and after the anesthetized one finally ceased his struggles add more ether *ad libitum*. Even more prominently in my memory is the time when a first year medical student administered ether to me, and I can still feel the gasping, choking sensation, as some few drams of the cold pungent liquid trickled down my esophagus. I made a solemn vow then, during my last moments of consciousness, that, if I ever survived the anesthetic, I would study some pleasant way of taking a patient's mind off himself without first strangling him. For some eight years after my graduation I was connected with a very active surgical clinic, where several anesthetics were induced daily. During that period I gave many hundred anesthetics, and these mostly to children.

Nowadays, the operator can have his patient anesthetized by warmed and perfumed vapor, so that the entire operating room will be filled with the pleasant odor of oil of bergamot. And should not the surgeon also be spared the ill-smelling ethereal fumes as well as the patient? Thus we find ourselves at the present moment seemingly at the topmost round of the ladder of anesthetic art. Where the pendulum swings through such a wide space there is surely a middle way, and it is to this practical central anesthetic way that I will invite your attention.

You may mentally remark that anesthesia is a long way removed from pediatrics, but I will say at the outset that I know of no two subjects which are related closer to each other than are these. Even the anesthetized adult is a mere child; he breathes, his heart beats, he utters incoherent bits of language, his bladder and rectum go back on him at times; in fact, he is just about in the same class as a baby. So that even though this



paper is limited to a consideration of anesthesia of infants and children, it would apply in a great measure to adults. There is danger from the anesthetic, and at times there is great danger, so that the first thing to be borne in mind is that anesthesia is a thing to be reckoned with in every operation, no matter how trivial it appears. From my experience in giving anesthetics I have learned that there are three factors which must be considered in every case—first the patient, second the anesthetic, and third the method of administration.

As a general rule, infants and children bear anesthetics very well. They do not require as much of a given anesthetic as does an adult. They will usually go under the anesthetic more quickly, and in many instances more quietly, than adults. Children usually resent having their face covered with any form of mask. If the child is of a reasonable age, much can be done to calm his fears by a thorough explanation to him of what you intend to do and that you will in no way hurt him.

*Preparation of the Patient.*—The best time to administer an anesthetic to an infant or a child is eight o'clock in the morning, after he has had a good night's rest, and before he begins to fret for food. Nervous exhaustion or other factors which will in any way lower the vitality are to be avoided. No anesthetic should be given within five hours of a meal not easily digested, as partial anesthesia tends to excite vomiting and may in that way produce harmful results from inspiration of the stomach contents. If the patient is to be operated on at 2 P.M., a light meal which, in the case of a child, should consist of broth or gelatin jelly, or thick gruel, may be given at 9 A.M. I am certain that the vitality of many infants and children has been unnecessarily lowered by too long fasts before operation. The use of too drastic cathartics is also to be deprecated. In infants, an enema an hour before operation is all that is required. In children, a teaspoonful of syrup of rhubarb or aromatic cascara, given the night before, and a low soapsuds enema in the morning of the operation is sufficient. A physical examination should be made of the patient before giving him an anesthetic. It is well to examine the blood and always to examine the urine. Heart lesions in children are not of so much importance as the question whether or not the heart is compensating. Enlarged cervical glands may by pressure cause respiratory difficulty.

A child whose nasopharynx is obstructed to a great degree



by adenoids or tonsils may suffer from dyspnea while under the anesthetic; he will become cyanotic very easily.

The presence of any disease of the chest which interferes with the full and unrestricted normal respiratory movements, indicates that we are not to give an anesthetic which would tend to increase this embarrassment. The danger of the anesthetic is always greater when any form of cyanosis exists. Distention of the abdomen increases respiratory embarrassment.

The temperature of the room, in which the operation is to be performed, should be 65° to 70° F. In abdominal operations the temperature of the room should be somewhat warmer. There should be good ventilation; no fire of any kind, and no gas burning. It is a great advantage for the anesthetist to get at once on good terms with the child, never to fool him or to tell him any statement which is not absolutely true. The anesthetist will get along better with his little patient if he ascertains the child's first name and tries to make the child his friend from the moment he sees him.

The patient should wear loose clothing, such as an undershirt and an ordinary night dress. He should have on warm, thick stockings and no garters. His feet should be kept warm. He should be well covered with a light blanket, yet it must be seen that the coverings of the patient in no way restrict his respiratory movements. It is our duty to see that the operator, his assistants or nurses in no way lean on the patient, and no heavy surgical instruments should rest on his chest or abdomen.

Examine the child's mouth for any loose teeth which may during the anesthesia become dislodged.

Children understand a great deal, therefore there should be no loud talking about subjects which might tend to scare the child. There should be absolute quiet during the induction of anesthesia. If continuous vomiting occurs, such as may be seen in intestinal obstruction or strangulated hernia, wash out the stomach before the anesthetic is begun. The anesthetist's hands should be free from odor, especially of cigarettes. This may seem a very small point to mention, yet it is one of the little things which count for a great deal.

The anesthetic should be administered when the child is on the operating table. I think it is an added risk to anesthetize the child in bed and then carry him to the operating table. Never leave the patient alone after the operation until he is conscious

or he falls into a gentle normal sleep. If you do leave a child alone or with an incompetent attendant, the patient is running the following risks: he may roll his head into a faulty position and his respiration become impeded; he may vomit and become asphyxiated; he may suddenly sit up and have a fatal attack of syncope.

Never begin the anesthetic until the surgeon is ready to operate. This is a thing that I wish to impress not only upon anesthetists, but upon the general operator. I have seen many patients who have been kept under anesthesia anywhere from five to thirty minutes before the operator was ready to begin.

The patient should always be anesthetized in the dorsal position.

After the operation the patient should be placed in a warmed bed with a covering of one or two blankets, and hot-water bags well guarded should be placed at the feet. The urine should always be analyzed a week or so after an anesthetic has been given.

A breast-fed infant can be put to the breast two hours after coming out of the anesthetic. He should be nursed for only half the usual time; if all goes well, next time he may be nursed his full nursing period. A bottle-fed infant can be fed two hours after coming out of the anesthetic with his regular bottle-feeding diluted one-half with water; if all goes well, his next bottle-feeding should consist of his usual food. A child can be given something to eat not sooner than two hours after coming out of the anesthetic. This food consists of hot broth; in throat cases the first food should consist of cold broth.

*The Anesthetic.*—The three great anesthetics are nitrous oxide gas, ether and chloroform. There are all sorts of combinations of these three anesthetics. Therefore, if we are called upon to give an anesthetic to an infant or a child, it will be a question which of these three, or what combination of them, we should choose? Infants do not bear nitrous oxide gas well, so that I should strongly advise against its use in a child under one year old. Best and safest for a healthy infant is ether by the open drop method. The best and safest anesthetic for a healthy child is a small amount of nitrous oxide gas, just enough to deaden the sensibilities, followed by ether either by the open or by the closed methods. Feeble or anemic children are best anesthetized by ether given by the open drop

method. I make it a point never to use chloroform as the sole anesthetic, unless some inflammatory lung process exists or has lately been in progress, which makes ether a bad anesthetic to use on account of its irritation to the mucous membrane of the respiratory tract. Chloroform should never be given simply because it is an "easy" anesthetic to give, for it is to be remembered that just as soon as chloroform is introduced into an anesthesia we are bringing an added risk to the patient. Anesthesia should always be induced by a duly qualified physician.

The addition of oxygen to ether is indicated in cases where cyanosis or coughing is set up to a great degree by the use of ether alone.

Given the case of a child with endocarditis, what anesthetic shall we use? I see no reason why a case of endocarditis should not be anesthetized the same as a normal child, provided, of course, that the heart is compensating well. Just because we find endocardial murmurs is no reason why we should refuse or be afraid to anesthetize the patient.

Do not give chloroform in a small room where gas is burning, as a very irritant gas (phosgene gas) is produced by the combustion of chloroform vapor and illuminating gas.

In heart cases we should avoid all undue struggling or fright during the induction of anesthesia. Oxygen either added to the nitrous oxide gas or given later on with the ether, is of value with these heart cases. Never hurry the induction of anesthesia in cardiac cases. Chloroform causes a fall of blood pressure, ether causes a rise of blood pressure. It may be stated on pretty good authority that, if ether is not given in excessive quantity, there will be no damage to the kidneys.

In choosing an anesthetic for a case in which nephritis exists, I should select ether by the open drop method and be careful not to keep my patient under too deeply. In cases where excessive shock is present, ether is the best choice, especially when combined with oxygen; a very small amount of the anesthetic is required in these cases of shock; air should be given freely during the anesthesia.

In operations about the mouth and nose, where the cautery is not used, nitrous oxide gas, followed by ether, is generally employed.

Regarding the relative safety of the above-mentioned anesthetics, I can only quote from two sources—the experience of



others and my own observations. From the collected chloroform deaths mentioned by six authorities, there occurred one death in every 2,986 administrations; from the collected ether deaths mentioned by four authorities, there occurred one death in every 16,000 administrations. The statistics of nitrous oxide gas show that one death occurred in every 100,000 cases. In my own experience I have seen two very close calls during chloroform anesthesia. One of these cases was in a healthy boy of five years upon whom I operated for circumcision. The anesthetic was very skilfully administered by one of the assistant physicians at the hospital. Suddenly the child had an attack of syncope and it was only by prompt measures that his life was saved. The second case was anesthetized by one of our acknowledged best anesthetists. The infant suddenly stopped breathing, and it was only by quick work that a fatality was averted.

I make no mention of the various other anesthetics, such as chloride of ethyl, bromide of ethyl, amylene, A. C. E. mixtures, methylene mixture, as I have never used them and probably never shall.

*Accidents During Anesthesia.*—The first things to use in an accident of anesthesia are your hands and your head, and *not* a hypodermic syringe. Nevertheless, a person administering an anesthetic should provide himself with the following emergency kit: Tongue forceps, mouth gag, jaw separator, stomach tube, intubation set, hypodermic syringe, and the following drugs: Glass ampoules containing a sterile hypodermic solution of caffeine and sodium benzoate,  $3\frac{3}{4}$  grains of each drug,  $\frac{1}{4}$  of ampoule to a child one year old,  $\frac{1}{2}$  to a child three years old; camphor in oil, sterile solution, 3 grains of camphor in each,  $\frac{1}{4}$  ampoule to a child one year old,  $\frac{1}{2}$  to a child three years old; adrenalin chloride, 16 minims sterile solution 1:10,000, 5 m. to a child one year old, 10 m. to a child three years old. Also one should have at hand some glass vaporoles of aromatic ammonia and amyl nitrite. These vaporoles may be crushed in the hand and held so that the patient will inhale the contents. Foreign bodies, such as teeth, small pieces of gauze and pieces of broken instruments, should be guarded against. Great care should be exercised that vomited food, mucus and saliva are not inhaled. Upon the patient's vomiting, the face piece of the inhaler should be removed, the head turned well to one



side, the mouth opened and the throat swabbed. If a retropharyngeal abscess bursts, or an empyema breaks through into a bronchus, or the throat fills suddenly with pus or blood, the patient should be quickly inverted. Spasm of the glottis, when it happens, usually occurs during the induction of the anesthesia and is attended with a good deal of danger. The remedy is to pull the jaw well forward and make traction upon the tongue. Making pressure on the lower ribs is of value. When the spasm is relieved it is well to add oxygen to the anesthetic when the mask is re-applied.

*Cyanosis.*—Give air or oxygen. Never allow a patient to stay cyanosed, even though he remains only slightly so. If embarrassment of respiration persists, even after drawing the tongue forward and clearing the upper respiratory tract, commence artificial respiration. Insufflation of the lungs in infants and young children may be performed in an emergency by the mouth to mouth method. I always carry an insufflation catheter, which consists of a piece of  $\frac{1}{4}$  inch metal tubing, curved at one end, fastened to which is the hard rubber nasal tip of a neublizer. This tube is attached to the foot-bulb of the vapor inhaler and makes an excellent insufflation apparatus for the treatment of asphyxia.

*Syncope.*—This may occur with any of the forms of anesthesia, but it is most dangerous when it happens during the administration of chloroform. Its presence means both respiratory and cardiac failure, and the anesthetic should be stopped at once. Lower the head, raise the legs and arms. Break a vaporole of amyl nitrate and allow the patient to inhale the fumes. Aromatic ammonia can be given in the same way. Artificial respiration should be performed. Caffein and sodium benzoate and camphor in oil should be employed hypodermatically. Adrenalin chloride solution, used hypodermatically, is also indicated. A hot saline per rectum should be given. Slap the patient's face and chest with cold, wet cloths. The person giving the anesthetic should remain with the patient until he is out of the anesthesia or he fall into a natural sleep with good color, pulse and respiration.

*Method of Administration.*—The usual methods of giving anesthetics are the following:

*Nitrous Oxide Gas.*—This gas is generally given from cylinders of liquid nitrous oxide by means of a rubber bag attached

to an inhaler having two valves, one for the inflow of gas which the patient inhales, and another valve for the outflow of the patient's expiration. There are many such inhalers upon the market, most of which are good. The face piece is inflated, adjusted to the patient's face, a few respirations are taken to see if the valves are working well, the patient finds his breathing no different from usual and becomes more or less accustomed to his surroundings. By throwing over a little lever at the moment of inspiration the air valve is closed and the gas valve is opened. After the patient has taken two or three respirations and cleared the lungs of air, he is allowed to breathe "to and fro," breathing in and out of the gas bag; after five to eight respirations he begins to go under the effect of the gas. He is allowed to take

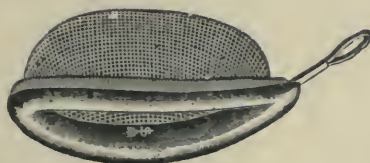


FIG. 1.—The Yankauer Inhaler for open method.

four to six more respirations, when he will usually be completely anesthetized. The bag should never be filled so that the gas is under positive pressure. The bag should be only three-quarters full.

There should be no unnecessary noise made while the patient is going under an anesthetic. Do not push the nitrous oxide gas after the first signs of jactitation occur.

The patient is usually slightly cyanotic, and unless oxygen or air is used along with the nitrous oxide gas he will remain so more or less during the entire anesthesia.

An adult can be kept under nitrous oxide gas for some time, one or two hours if necessary, by giving the gas up to the point of deep anesthesia, then removing the mask or allowing air to enter for a few respirations until consciousness almost begins to return, which is evidenced by the patient losing his congested look and assuming a more conscious expression. Then a few more inhalations of nitrous oxide gas are given, and so on. I should not recommend the prolonged use of nitrous oxide gas in

a child. In an infant I should never use it. To anesthetize a young infant, I have always had the best results from using a simple face mask like Esmarck's, or Yankauer's and giving ether by the open drop method. The anesthesia may be hastened by covering the mask with a piece of oiled silk or guttapercha tissue over the gauze and cutting a small hole about the size of a five-cent piece in the top, through which the ether may be dropped upon the ex-

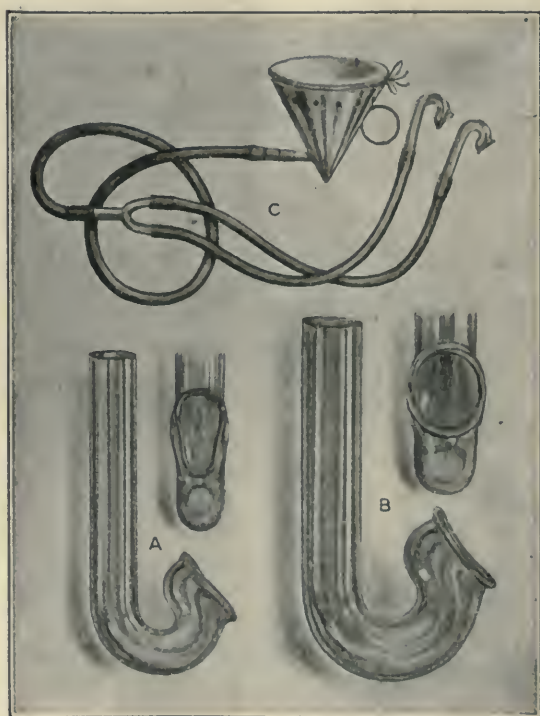


FIG. 2.—Lumbard Nasal Tubes.

posed gauze covering. This makes practically a closed inhaler. This method is useful in infants under a year old. When ether is contraindicated, I use chloroform by the open drop method, using the same gauze covered face mask without the silk or guttapercha tissue. When beginning chloroform, go slowly, usually about one drop to each inspiration. Sometimes in older children, who are extremely nervous, a few preliminary drops of eau de cologne upon the mask will tend to quiet their fears.

F o r operations about the face, such as adenoids, tonsils, mastoid, harelip, cleft palate, etc., there is no method which compares with the so-called vapor method of anesthesia, through nasal tubes, mouth gag or throat tube. The patient is anesthetized by either the open drop method (if an infant), or by the nitrous oxide-ether-sequence until pretty thoroughly under the anesthetic. Then the face inhaler is withdrawn, and the nasal tubes



FIG. 3.—Lumbard Tubes in Use.

of glass as devised by Dr. Lumbard, or the mouth gag as devised by Dr. Gwathmey, or the throat tube is introduced and placed in position. The patient by this means may be kept under any length of time the operator may wish by use of the vapor of ether or chloroform or any combination of the two.



FIG. 4.—Ferguson-Gwathmey Gag, with Anesthesia Tubes.

After a child has been thoroughly anesthetized, it takes very little ether vapor to keep him in that state; if he begins to show signs of coming out, a few inspirations of chloroform vapor are given him and he again relaxes.

Volumes have been, and probably still will be, written about the advantages of one vapor inhaler over another one. Wordy discussions will ever be heard as to the merits of warmed vapor



anesthesia. I can only give my own ideas regarding which inhaler I prefer when giving a vapor anesthesia. After much experimenting I have chosen a vapor inhaler devised by Dr. Pynchon, of Chicago, which apparatus consists of but two bottles, both of the same size, one for ether and one for mixing the gases. The pressure is generated by a 6-ounce Pollitzer bag



FIG. 5.—The Pynchon Inhaler for Ether or Chloroform Vapor. Lumbard Tubes, which are to be used with the inhaler, are not the ones illustrated.

used as a foot pump. Air is made to go through the ether, more or less as desired, by turning a small lever at the top of the ether bottle. This air is then passed into the twin mixing bottle, which is empty, becomes more or less warmed by virtue of the room temperature which surrounds the mixing bottle, and is then passed into the efferent tube leading to the nasal tubes, mouth gag or throat tube. Hanging down in the middle of the

mixing bottle there is very ingeniously placed a 2-ounce bottle for chloroform, which, by pressure of a small rubber bulb, is made to exude by drops or gentle stream into the mixing bottle. The current of air, is thus made to become impregnated with a drop or two of chloroform or up to full saturation, depending upon the amount of chloroform expressed by the gentle pressure of the bulb. I have been in the habit of winding a small 2-inch bandage several turns around a chloroform bottle, as I find this to be a better means of impregnating the current of air with chloroform than if the chloroform were deposited upon the floor of the mixing bottle. Thus we have at our disposal at all times a light or heavy ether vapor, a light or heavy chloroform vapor, or any combination of the two which we desire. At the same time we have but two bottles of about 6 ounces each. They may be hung by the hook to the belt of the anesthetist or fastened to the operating gown with a large safety-pin, or hung from the neck, or they may be placed upon a table near the patient. The value of washing the vapor by passing it through water in a third bottle has yet to be demonstrated to me to my satisfaction. Given a good make of ether or chloroform, I personally believe that there are practically no impurities contained therein. A two-bottle inhaler fits or adjusts itself better to the anesthetist's body than does a three-bottle inhaler.

A word regarding warmed vapor. If the warming or heating apparatus is used to warm the air *before* this air is passed through the ether, it is a question in my own mind as to how much warmer, if any, is the ether vapor after going through the vapor apparatus and traversing the rubber tube leading to the patient. The natural place for a warmer to be situated is at the patient's mouth, and this is impossible with any inhaler I have ever seen, except the Coburn inhaler, which I shall presently describe.

For some time I have been experimenting, trying to produce an inhaler which could be used to give nitrous oxide gas to be followed, if required, by ether by the drop dose by the open or by the closed method, the ether chamber to be warmed if desired. A better and safer anesthesia could be given if the ether could be delivered to the ether chamber in drop doses under perfect control of the anesthetist than has been possible by the usual custom in all inhalers, namely, of adding from

1 to 2 drams of ether *all at once* to the ether chamber and then repeating this process in from two to five minutes after the previous ether had been used by the patient. This, to my mind is theoretically, and I believe practically, giving an uneven anesthesia, because the patient must necessarily get more ether just after a fresh supply has been added than he does when the supply is about exhausted on the gauze in the ether chamber.

The inhaler devised by Dr. Raymond C. Coburn, of this city, who, I find, has been working independently along the same lines as I, has answered all my requirements and is a perfected apparatus in which my fondest hopes have been realized.

As may be seen by the illustration, which is almost self-

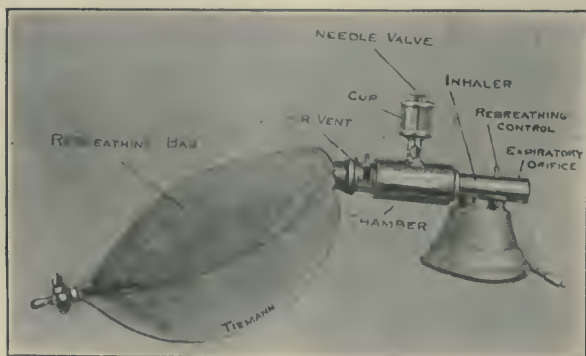


FIG. 6.—The Coburn Inhaler.

explanatory, the inhaler consists of an ether chamber, a regulating drop reservoir, which delivers ether direct to the gauze in the ether chamber, a face piece which may be rotated to correspond to any position of the patient, a supplemental bag for the closed method or for nitrous oxide gas.

When using the inhaler for ether by the open method, there is a valve by which the exhalation is allowed to pass out, thus preventing the expiration from passing through the ether chamber, wasting the ether and also puffing it into the anesthetist's or operator's face. This inhaler may likewise be used for chloroform, as by the open method there is no rebreathing in any way, the chloroform is thoroughly mixed with air, enters the patient's lungs and then is expired by the expiratory valve of

the inhaler. It is a well-known fact, proved by experiment, that when using almost any ether inhaler with the open method that the air after passing through the ether chamber becomes very cold, even in a moderate anesthesia, while in a long anesthesia the temperature of this ether-laden inspired air sometimes reaches 32°F. (freezing point). By a very ingenious, small, but thoroughly efficient electric heater, the plug of which may be attached to any house electric bulb socket, an evenly heated



FIG. 7.—The Electric Heater applied to the Coburn Inhaler.

ether vapor of the *same temperature as the body* is constantly on hand in the ether chamber of the inhaler. The electric warmer is on the ether chamber out of which the patient breathes directly. Therefore he is assured a supply of etherized air which is warmed to some 40 or 50 degrees above the etherized air from any other open method ether inhaler which I have yet seen. This, to my mind, is a great advantage in the administration of this anesthetic, as I am sure that any one of us would rather inspire etherized vapor of 80° or 90° F., than we would to breathe one of 32° to 35° F. The induction is smoother, cough and laryngeal spasm are hardly ever seen, and I think the pa-



tient is in a better physical condition, especially after a long anesthesia when the above open drop method of warm ether anesthesia has been used. This method uses about the minimum

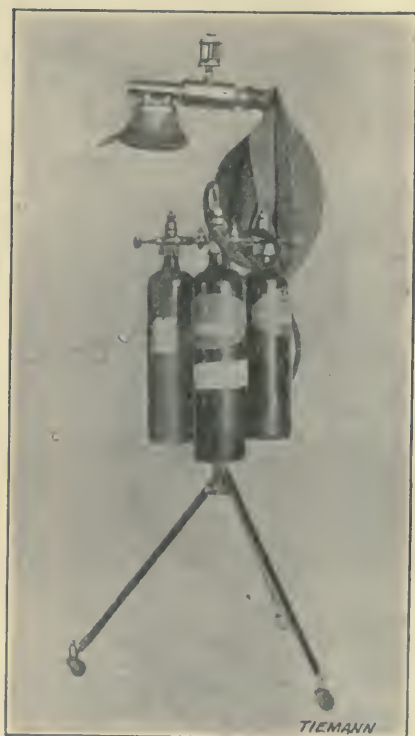


FIG. 8.—The Folding Portable Stand, with Gas and Oxygen Cylinders and Coburn Inhaler.

amount of ether, especially as the drug is only inspired and no return air goes through the ether chamber to waste the ether. The electric heater may be applied or removed in an instant. The folding cylinder stand is portable, and may be carried in the anesthesia hand bag. The small 25-gallon gas cylinders add greatly to the compactness of the outfit.

These, then, are the methods which have given me the most satisfaction in the administration of anesthetics to infants and children, and I sincerely hope that as much, if not more, improvement in both apparatus and technique will be no-

ticed in the coming decade as in the past, for there is nothing which will be more gladly welcomed than anything which will in any degree, no matter how trivial, relieve the anxiety of the operator and increase the safety of the patient.

*165 West 85th Street.*

## URETHRAL CALCULI.\*

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Urethral calculi are formed primarily in the urethra, or they may arise from stones of renal or vesical origin, which, becoming impacted in the urethra, undergo an appreciable enlargement in this situation. Calculi, which are arrested in the urethra, and retained for a short time or removed immediately by operation are not spoken of as "urethral."

The predisposing causes of calculus are largely those which bring about precipitation of the urinary constituents, factors which may occur in the urethra as well as in other portions of the urinary tract. Stagnation of urine followed by fermentation, in the presence of a suitable nucleus, provides the factors which may result in the formation of a stone. The nucleus may be a foreign body in the strict sense of the term, although a small blood clot, a flake of mucus or pus, may serve as the point about which the salts are deposited.

Given such predisposing conditions, therefore, calculi may develop in urethral diverticula, which variety will be alluded to later, or in the urethra behind any point of constriction. This may be present in stricture formation or in the minor degrees of narrowing following trauma or inflammation. The urethra posterior to such a point undergoes dilatation from the pressure of the urine, a slight amount is retained which, in decomposing, predisposes to calculus formation.

A vesical calculus gaining entrance to the urethra can be arrested easily at one of the normal points of narrowing or behind an acquired stenosis. If small and regular in outline the stone may produce so few symptoms that retention of the foreign body and its subsequent enlargement is possible. The majority of such calculi, however, produce severe symptoms, and the retention of urine or pain which follows the impaction will demand immediate surgical relief in the majority of cases.

While it is difficult to prove that a calculus may arise primarily in the urethra, except in diverticula, nevertheless the his-

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\* Read before the Philadelphia Pediatric Society, March 12, 1912.

tory of certain cases indicates that a small number are formed in this manner. The calculus, minute at first and soft in consistency because of its composition, forms a foreign body which produces very slight irritation of the urethral mucosa. The urethra thus accustoms itself to the irritation, and even when the stone reaches considerable size it may cause but slight discomfort, and not prove serious unless the lumen of the canal is entirely shut off, or some other complication arises. The degree of tolerance of the urethra has been ascribed, not so much to the amount of mechanical obstruction as to the development of infection, a complication readily favored by the stagnation of urine and the irritation produced by the calculus.

In children a single calculus is generally found, although two or three have occurred in several cases, and as many as eight stones have been formed in the anterior urethra. The occurrence of multiple calculi in the prostatic urethra of adults is not uncommon. The greatest number has been observed in diverticula, where dozens of minute calculi may fill the sac; 162 were found in a case reported by Grube.

The stones which are formed in the urethra are usually composed of phosphates, whereas those which become impacted and subsequently enlarge have a nucleus consisting of uric acid or oxalates, and the layers obtained in the urethra are phosphatic. The salts are deposited on the posterior surface of the stone, so that its subsequent enlargement is toward the bladder. The primary nucleus is often found, for this reason, in the anterior portion of the stone, and not centrally, as in other calculi. The character of the salts forming the calculi decides its consistency to a great extent. The majority of urethral calculi are soft because they are composed of phosphates, although a few uric acid stones have been reported.

The calculi which arise primarily in the urethra naturally have no site of predilection, their situation depending on the factors predisposing to the stone; *i.e.*, scar formation, stricture, diverticula, etc. Those which are formed from impacted calculi are found most commonly in the fossa navicularis and membranous urethra, because the canal anterior to these points is naturally narrow. The membranous urethra because of its great distensibility, appears to be most tolerant to irritation, and instances are cited in which a calculus has remained in this situation for thirty or forty years.

The occurrence of urethral calculi in children is explained by the fact that the prostate is in a rudimentary state, and the neck of the bladder is readily dilated, both factors permitting calculi to enter the urethra easily. The frequency of urethral stones in childhood and the part of the urethra involved is well shown in the following table (Englisch, *Arch. f. Klin. Chir.*, 1904, Vol. LXXII., p. 487):

			Fos. Nav.	Pars Pendula.	Pars Scrotal.	Pars Bulb.	Pars Memb.
Until	1 year	5	1	2	1	0	1
"	2 years	23	2	1	6	4	7
"	3 "	6	2	1	2	1	0
"	4 "	14	7	1	1	1	4
"	5 "	6	1	2	0	1	1
"	6 "	12	1	3	2	1	3
"	7 "	5	1	0	1	1	2
"	8 "	4	1	1	0	1	1
"	9 "	7	1	1	1	2	2
"	10 "	10	1	1	0	4	3
	11-15 "	35	4	1	5	7	17

The gradual enlargement of a urethral stone, in the absence of irritation or inflammation, is accompanied by few, if any, subjective symptoms. The patients may complain of pain radiating toward the end of the penis, and disturbances in micturition soon follow. Alteration in the size and shape of the stream with sudden interruption without retention may be present. Retention may be complete or incomplete, and may be the first sign produced by a calculus. The urine is cloudy and not infrequently hematuria is pronounced. The irritation of the stone produces a discharge which may resemble a specific urethritis from which the diagnosis may have to be made. The prostatic stones in particular produce such irritation that rectal tenesmus occasionally arises, and in some cases prolapse of the rectum has taken place. Convulsions are not infrequent in children.

The presence of a calculus in the urethra is sooner or later manifested by ulceration and the symptoms of local or general infection. Locally, the ulceration is followed by abscess formation, the stone may be discharged and a urinary fistula remain. In other instances and frequently in children, extravasation of urine takes place; this is followed by suppuration and gangrene



of the parts involved. The long continued obstruction to the flow of urine reacts upon the bladder which undergoes hypertrophy and dilatation. In the presence of a dilated urethra and bladder, ascending infection with involvement of the kidney (pyelonephritis) is likely to develop.

The diagnosis may be made by palpation when the stone is in the penile urethra, or by rectal examination when situated in the posterior urethra. The foreign body in some cases is freely movable and in others is firmly impacted. The movable stones may act as a ball-valve and account for the intermittent attacks of retention which are frequently met with. The use of the searcher gives the characteristic click of a stone, or a grating sound is elicited as the instrument passes over it. When impacted in the fossa navicularis, the stone may be seen by opening the meatus. Considerable difficulty will be encountered in the cases in which a calculus has formed behind a point of constriction, for the use of instruments as a diagnostic aid may thus be prevented. The X-ray may be of help in such cases and the urethroscope may be necessary in making the diagnosis. When extravasation with swelling and inflammation has taken place, the diagnosis is very difficult. Here a careful history may be of the greatest assistance, especially if trauma can be excluded.

Diverticula of the urethra are congenital or acquired, the latter being by far the more frequent. The congenital variety follows distension of the urethra in the embryo at a time when the canal is not fully formed, so that urinary stagnation readily causes dilatation. The acquired diverticula are caused by cysts or abscesses ulcerating through the urethral wall, or they may be due to cicatricial contraction secondary to inflammation or operations. The diverticula are formed in the same manner as are the traction diverticula of the esophagus. Strictures, inflammation or any factor leading to retention of urine in the urethra may cause a dilatation of the canal and produce a diverticula.

The congenital type of diverticula is found in the peno-scrotal region, and as they enlarge the inferior portion of the penis and urethra are altered in outline. The deformity thus caused may interfere with micturation, and as the sac communicates with the urethra stagnation of urine in the diverticulum is usually present.

Acquired diverticula, on the other hand, may arise in any

portion of the urethra, but are most commonly encountered in the membranous. The tumor gradually enlarges causing distortion of the penis, and becomes painful when ulceration takes place. Stagnation of urine followed by fermentation favors separation of the urinary constituents, and if a nucleus of blood or mucus is present stone formation is apt to arise.

Many of the calculi in the anterior urethra can be removed by means of forceps. A preliminary meatomy may be required, especially when the stone is in the fossa navicularis. Incision over the stone may be necessary when firm impaction has taken place in the penile urethra. Calculi in the posterior urethra may be pushed into the bladder and removed by litholapaxy or cystotomy. If impaction is firm great care must be used in such an attempt or rupture of the urethra may result. When rupture of the posterior urethra has been followed by extravasation of urine, perineal section must be performed, the stone removed and adequate drainage provided for the parts infiltrated. The occurrence of diverticula in children is rare, but when present radical operation with complete removal of the sac and closure of the opening into the urethra must be undertaken.

The writer desires to thank Dr. John H. Jopson for permission to report the following cases which were treated in his service at the Children's and Presbyterian Hospitals.

CASE I. Boy aged two years, previously well, developed sudden retention of urine which was unrelieved for two days. He was successfully catheterized, but afterward was unable to void urine. A second attempt to catheterize was unsuccessful; he was then sent to the Presbyterian Hospital, having had retention for eighteen hours. On examination the bladder was found to be greatly distended, and the prepuce was long, adherent and edematous. The resident physician, Dr. H. H. Hobbs, was unable to insert a rubber catheter but introduced a metal one without difficulty and withdrew 18 ounces of urine. On exploration an obstruction was found about one inch from the meatus; it was regarded as a stricture at first, but on palpation a small nodule, about the size of a pea, was felt. The diagnosis of calculus was made, the child etherized and the meatus cut. The stone was firmly impacted in the urethra, was the size of a pea, oval in shape, soft in consistency and composed of phosphates. The urine was voided normally after the removal of the stone; exploration of the bladder was negative. It was

regarded as a primary urethral calculus because there was nothing in the history of the case to point to its origin elsewhere in the urinary tract. The symptoms were of sixty hours duration and the calculus was so firmly embedded in the urethral tissues that it must have been present for a considerable length of time.

CASE II. Male, aged three, was admitted to the Children's Hospital with symptoms of retention. An attempt to catheterize was unsuccessful, the child suffering considerable pain and there was much straining. The prepuce was adherent, and on stripping it back a small stone could be felt and was seen on opening the meatus. It was removed without difficulty; the stone was not firmly impacted in the urethra, but freely movable. It was hard in consistency, composed of uric acid, and apparently arose in the bladder.

The symptoms in this case were due to a vesical calculus impacted in the urethra in its passage from the bladder. The symptoms were much the same as Case I., but the origin of the stone was not the same.

CASE III. The following case, occurring in a male adult forty-nine years of age, has many points of interest. The patient gives the history of an attack of renal colic in 1904, the calculus being passed with great pain, and finally became impacted in the penile urethra, about four inches from the meatus. It was removed by an incision over the site of impaction.

There was no further trouble until October 26th, 1911, when another typical attack of renal colic developed. He recovered, resumed his work, and was not troubled until December 7, 1911, when sudden stoppage of the stream occurred in urinating. For this condition he was admitted to the Presbyterian Hospital. He was unable to urinate beyond a mere dribble, and complained of constant desire to urinate and pain. On exploring the urethra the searcher elicited a rough sensation, and on palpation a small nodule could be felt in the urethra, at the site of the previous operation, near the penoscrotal junction. The stone produced considerable local pain, but could be forced toward the meatus, was grasped with forceps, crushed and removed. It was a uric acid calculus. The urethra admits a number twenty-four sound with difficulty, showing that there is no distinct stricture, although a point of narrowing must have followed the first operation, and was instrumental in the impaction of the second stone.

# VITILIGO, WITH THE REPORT OF A CASE APPEAR- ING TWO WEEKS AFTER AN ATTACK OF SCAR- LET FEVER.\*

BY HOWARD KENNEDY HILL, M.D.,  
Philadelphia.

Owing to our present state of ignorance as to the etiology of vitiligo, it seemed sufficiently interesting to show this case to the Society. Whether the skin condition happened to appear as a mere coincidence after this attack of scarlet fever I cannot say; I rather think not.

The girl, B. K., now eleven years old, came to the dispensary for children's diseases at the Presbyterian Hospital. She was born at term, in Haverhill, Mass., of Armenian parents, who came from Harpool, Turkey in Asia, the father being a rug-weaver. There are two other healthy children. This child was breast-fed for a year, and has had chicken-pox, measles, diphtheria (three years ago) and scarlet fever (last year) in the order named. She was treated in the Municipal Hospital for the last two diseases. Her brother, who also contracted diphtheria, went to the hospital with scarlet fever at the same time as his sister.

The vitiligo appeared during this stay (of six weeks) in the hospital, and was noticed at once by the mother, the day the child was brought home.

The blood count, at present (March 9, 1912) shows:—

Hemoglobin .....	80 per cent.
Red blood corpuscles .....	4,000,000
White blood corpuscles .....	8,800

Differential count:—

Polymorphonuclears .....	70 per cent.
Lymphocytes .....	19 " "
Large mononuclears .....	2 " "
Transitionals .....	1 " "
Eosinophiles .....	7 " "
Basophiles .....	1 " "

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\* Patient shown before the Philadelphia Pediatric Society on March 12, 1912.



The urine now shows a specific gravity of 1.023, acid, no albumin, no sugar, no acetone, a few white blood corpuscles and red blood corpuscles, a moderate number of epithelial cells, and no casts.

There is a slight systolic murmur, heard best lying down, over the pulmonic area, and not heard at the apex, and not transmitted. Her voice is normal. There are no other trophic disturbances.

Among the true sequelæ of scarlet fever, which may begin as complications, are many in which the nervous system is involved. Occasionally, when there is severe kidney disease, sets of muscles are contracted, with at times permanent deformity. Chorea may appear, along with an endocarditis, or an arthritis. A progressive paralysis with wasting, resembling Landry's ascending spinal paralysis, may occur.

Scarlet fever may co-exist with any of the other exanthemata, and certainly frequently just precedes, or follows quickly on top of, one of the other eruptive fevers. Some chronic affections partially or entirely disappear during an attack of scarlet fever, such as some forms of eczema and psoriasis, but these usually reappear after convalescence. The results are not, however, as startling as some recoveries, especially sarcomas, which have followed attacks of erysipelas. But we have never heard of the report of a previous case of vitiligo following scarlet fever, although rarely it is said to follow scarlet fever and typhoid fever, and even occurs as an epidemic disease of unknown cause, according to Aldred Scott Warthin. Usually cases occur idiopathically. Often, as in this case, there is associated a leucotrichia acquisita, or blanching of small clumps of hair.

The etiology is still unknown. There is an atrophy of the chromatophores, which are specialized connective tissue cells, just beneath the cells of the rete. The cause may have to do with a disturbance of the function of the adrenal gland, as in Addison's disease, or of the sympathetic nervous system. At least, it is usually agreed to be due to some form of perverted innervation.

Vitiligo sometimes occurs in Graves's disease, or there may be a simple brownish discoloration, like sunburn, usually where the clothing presses against the skin, or there may be the diffuse pigmentation of Addison's disease, from which vitiligo is easily

differentiated. These all seem to fade away, as temporary improvement takes place during the course of exophthalmic goiter. Leloir has described a parenchymatous neuritis, in which the axis-cylinder has disappeared, the myelin sheath has broken down, and the nerve fiber has been destroyed in a case of myelitis.

The evident relation of abnormal pigmentation to the function of internal secretion of the thyroid and suprarenal glands, and the possible upsetting, by an attack of scarlet fever, of the delicate nervous mechanism having to do with the function and secretion of these glands, and the rarity of the condition following scarlet fever, seem to me to be the points of interest in this case.

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LITTLE'S DISEASE.—V. Hutinel and L. Babonneix (*Annales de Méd. et Chirurg. Infant.*) state that Little's disease is a congenital condition the causation of which is not well understood. Inasmuch as the disease appears immediately after birth and is essentially chronic there have been few autopsies, and these have been performed when the patient reached a late stage of childhood or even adult life. Hence the pathology and physiology are not well understood. The disease manifests itself in a condition of stiffness of the muscles, contracture, slight mental changes, convulsions, etc. It is especially frequent among premature children. It seems generally to be caused by the operation of several factors. These are mainly of a toxic, infectious or mechanical nature, in the last case arising from injuries at birth. The toxic and infectious causes may be operative before conception, as in syphilis; in the mother during pregnancy, as in alcoholism, and in the fetus before or after birth. Emotional causes have probably no real agency in the production of the disease. Infectious diseases and digestive disturbances in early life increase the already present failure of nutrition. All of these causes operate through the nervous tissues, the lesions being those of blood-vessel change, hemorrhage, and sclerosis. Complicated labor, premature labor, and asphyxia are given as causative factors. As to pathology there are always cerebral alterations about the upper Rolandic area and in the pyramidal tracts which differ in no way from those present in other varieties of cerebral paralysis.—*Medical Record.*

## MISCELLANEOUS.

### THE CODE OF STANDARDS OF THE AMERICAN ASSOCIATION OF MEDICAL MILK COMMISSIONS.\*

BY HENRY L. COIT, M.D.,  
Newark, N. J.

Soon after the organization of the American Association of Medical Milk Commissions in 1906, which is a federation of Medical Society Milk Commissions, the chief objects of which are to extend the pure milk movement and to standardize clinical milk and milk for infant feeding, it became apparent that there was a great lack of uniformity in the quality, purity and safety of the product resulting from the activity of these commissions.

Attempts were made from year to year to adopt methods, regulations and standards for the guidance of these Commissions, of which there have come to be a large number in this country. These standards related to the hygienic, chemical, biological, veterinary and safety features of the plan to obtain clinically clean milk, but were not assembled in a comprehensive code embodying all that was best in methods employed by the leading Commissions and taught by the best authorities.

At the annual meeting held in Philadelphia in 1911, a committee composed of Assistant Surgeon General John W. Kerr, Dr. S. McC. Hamill and the writer, was appointed to prepare a code of working methods and regulations, including definite standards of purity, quality and safety for certified milk, which should become the standards of the Association and a guide for all Commissions, so that certified milk shall be the same and equally reliable in all places, whether produced in Berkeley, Cal., or Boston, Mass.

The committee carefully studied all literature relating to the subject, issued a questionnaire to all known commissions throughout the world, of which there were nearly seventy, sifted the replies to sixty-nine questions from forty-four Commissions, and rendered its report to the sixth annual meeting held at Louisville, May 1st, 1912. The report was adopted as the national code of standards for the production of certified milk.

It defines the product, the functions and objects of the Medical Milk Commission; prescribes in detail the appointment and organization of the Medical Milk Commission; outlines the duties of the Commission, the selection of the experts for the four lines of investigation and control required by the system.

\* Read before the Annual Meeting of the American Pediatric Society, Hot Springs, Va., May 29-31, 1912.



*Dairy Hygiene.*—It establishes definite standards of dairy hygiene as to pastures, surroundings, location and construction of buildings and stables, drinking and feeding troughs, stanchions, ventilation, windows, exclusion of flies, exclusion of animals from herd, bedding, cleaning stables and disposal of waste; cleaning cows, clipping, cleaning udders, foods, feeding, exercise, washing of hands, milking clothes, things to be avoided by milkers, fore-milk, milk and calving period, bloody and stringy milk, grouping of herd, employees other than milkers, straining and strainers, dairy building, temperature of milk, sealing of bottles, cleaning and sterilization of bottles, utensils, water supply, privies in relation to the water supply, toilet rooms, transportation, thirty hours being maximum age of certified milk when delivered; veterinary supervision, tuberculin test, disposition of reactors, disinfection of stables and exercising yards; identification of cows, records of tests as to dates and results; retesting, disposition of cows sick with diseases other than tuberculosis, notification of veterinary inspector, emaciated cows and their removal.

*Bacteriological Standards.*—Bacterial counts, numerical standard of less than 10,000 bacteria per cubic centimeter when delivered, weekly counts being made, and daily when in excess; if the normal is not restored in ten days, certificate to be suspended; collection of samples for examination, interval between milking and plating, plating technique, controls and duration of incubation, the media, the preparation of media, and methods are recommended, giving details to guide the bacteriologist employed by the Commission, determination of taste and odor of the milk at 100°F., the counts and records of bacteriological tests.

*Chemical Standards and Methods.*—Required findings to be reported by the chemist, method of obtaining samples, fat standard of 4 per cent., with a permissible range of variation of from 3.5 to 4.5 per cent.; fat standard for certified cream not less than 18 per cent., the content of both to be determined at least monthly; recommended methods are given in detail, including Babcock, Leffman-Beam and the Gerber. The protein standard for milk and cream is 3.5 per cent., with a permissible range of variation of from 3 to 4 per cent., determined by the Kjeldahl method; freedom of the milk from coloring matter and preservatives; tests for coloring matter, for formaldehyde, boric acid and borates, for salicylic acid, salicylates and benzoic acid; tests for the detection of heated milk to be applied once each



month; Storch's and Arnold's are given in detail; the microscopic test for heated milk of Frost and Ravenel is given; the specific gravity of 10.29 to 10.34 is required and methods of determining it are given.

*The Methods and Regulations for the Medical Examination of Employees, their Health and Personal Hygiene.*—An attending dairy physician is required, designated by the Commission, responsible to and reporting periodically to it; requirements for the physical examination of the workers on the dairy premises made periodically, and before new employees shall be brought to the plant; the examination and requirements having reference to recent vaccination, possible affections of the throat, tuberculosis, venereal disease, conjunctivitis, diarrhea, dysentery, typhoid fever or a typhoid carrier, disease of the respiratory tract, suppurative process, infectious skin eruption, any disease of an infectious or contagious nature or any person who has recently been associated with children sick of contagious disease; personal cleanliness of employees and, when housed on premises, proper habits and supervision of their living rooms, sleeping rooms, beds and bathing facilities are enjoined. When ill and resident on the dairy premises, a quarantine building is recommended, and its suitable construction is given in detail. The method of quarantine and isolation from the dairy of sick employees is given, with details for the taking of cultures of suspects and making reports to the Commission, with proper course for its officers' pending ultimate consideration and action. Methods are recommended for safeguarding the milk while exposed to possible infection, by notification of facts, and efficient sterilization of the milk during the period of incubation for the disease in question. Methods are also recommended for the disinfection of the plant. Following a periodical medical inspection of employees, a monthly report is required to be filed with the secretary of the Commission by the attending physician on the same recurring date and upon a recommended schedule blank provided by the commission for this purpose, and designed to furnish information that will enable the commission to guarantee the health and safety of all the employees.

The Code of Standards is now in press and it will be published in a few days by the Surgeon General of the United States.\*

*277 Mt. Prospect Avenue.*

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\* Public Health Report, Public Health and Marine Hospital Service, June 14, 1912.

## SOCIETY REPORTS.

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### THE PHILADELPHIA PEDIATRIC SOCIETY.

*March 12, 1912.*

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

#### CARPO-PEDAL SPASM.

DR. ELEANOR C. JONES presented a colored girl, aged fifteen months, showing symptoms of tetany. Carpo-pedal spasm is marked, while the hands show the so-called "obstetric hand." Chvostek's sign is marked and Erb's sign is also present. The knee-jerks are increased. The child has rachitis, with acute intestinal indigestion; is well nourished, but backward in development. She does not walk or talk. The treatment consisted of calomel, followed by high colon irrigation, bromides and calcium lactate. Upon this, the carpo-pedal spasm has become intermittent.

DR. H. K. HILL said that he had seen a similar case at the Babies' Hospital last summer suffering with severe and prolonged gastroenteritis, finally ending in death. The case here presented, giving a history of head nodding and having had slight nystagmus, is interesting as another case of spasmodic nutans, with a history of rachitis, of which Dr. Hill has reported 4, in a paper read before this Society last year. He suggested that this child may have always lived in a dark room.

DR. J. N. JOPSON quoted many authorities to support the theory that infantile tetany was due to hemorrhage into the parathyroids at birth, the spasm appearing only after fibroid changes had occurred in the parathyroid glands.

DR. J. F. SINCLAIR spoke of having seen 3 cases of tetany following gastroenteritis last summer. In one the tetany did not recur during two attacks of pneumonia, but reappeared somewhat during an attack of whooping-cough which the baby had recently had.

DR. LE BOUTILLIER said that he had seen a case of marked carpo-pedal spasm recently in a child with congenital syphilis and

hydrocephalus. Nystagmus was also noted, but without spasmus nutans.

#### CONGENITAL SYPHILIS.

DR. C. W. BURR showed two boys with congenital syphilis; one, seventeen years old, was about the size of an ordinary boy of ten years. Both showed many stigmata of degeneration.

DR. FREDERICK FRALEY stated that, at the Orthopedic Hospital, where such cases are not infrequently seen, spasticity in children is becoming considered very suggestive of syphilitic conditions.

In answer to Dr. O'Mara's query as to the occurrence of high palate in these cases, Dr. Burr said that a high palate alone was of no significance, but should only be considered when many other stigmata were found.

#### VITILIGO.

DR. HILL showed a girl of eleven years, of Armenian parentage, who, while in the Philadelphia Hospital for Contagious Diseases with scarlet fever, developed a typical case of vitiligo, which gradually spread over her shoulders, neck, back, arms and legs, appearing two weeks after the scarlet fever. There are also three small clumps of blanched hair, leukotrichia. Blood count showed 7 per cent. eosinophiles. Many forms of nervous diseases, such as chorea, may follow scarlet fever, while some chronic skin affections partially or entirely disappear during an attack of scarlet fever, only to return after convalescence, such as eczema and psoriasis. But vitiligo is rare after scarlet fever. The fact that the skin is discolored in Addison's disease and that vitiligo occurs in Graves's disease leads to the thought that the evident relation of abnormal pigmentation to the functions of internal secretion of the suprarenal or typhoid glands and the possible upsetting, by an attack of scarlet fever, of the delicate nervous mechanism having to do with the function and secretion of these glands may have something to do with the etiology of this case. (This case is reported in full on page 533.)

#### INTUSSUSCEPTION.

DR. M. S. CARMANY showed a specimen from a child of thirteen months, weaned three months before this attack. Though vomiting began on Friday, a physician was only called in on Sunday. The parents refused operation, though there were

mucous stools and a decided tumor. On Wednesday they permitted operation. Tympany now concealed the tumor. The tumor was easily reduced, but the patient was in such bad condition that only a hurried operation was possible; death followed a few hours later. The specimen shows two areas of gangrene, both in the long axis of the bowel.

DR. HILL spoke of having reported to this Society a similar case while he was resident physician at the Children's Hospital, which Dr. Le Conte had operated upon successfully eleven hours after admission, the child leaving the hospital on the twelfth day. The prominent symptoms were the passage of blood and mucus.

DR. JOHN SPEESE said that early diagnosis is essential in order to obtain cure by surgical measures and that cases of intussusception which exist twenty-four or forty-eight hours are generally fatal. We had seen 2 cases in which a prompt diagnosis was made and operation performed within four hours from the onset of symptoms. The physicians in both cases based the diagnosis upon the sudden appearance of bloody stools containing mucus and the presence of a palpable tumor. One case recovered, but the other died of pneumonia and a recurrence of the intussusception ten days after the first operation.

DR. JOPSON said that he had operated upon a number of cases of intussusception, all seen late and all fatal. Resection of the bowel had several times been necessary, and this is always fatal. With stools of pure mucus and blood and a palpable abdominal tumor, operation is immediately imperative. The teaching of the use of enemata as a means of reduction is bad, for this delay may kill the baby.

#### URETHRAL CALCULI.

DR. SPEESE reported 2 cases of urethral calculi occurring in children. (See p. 527 for article in full.)

DR. JOPSON said that he had reported 2 such cases ten years ago and had not seen any since. In both of his cases external urethrotomy was performed.

#### OPHTHALMIA NEONATORUM.

DR. ALICE WELD TALLANT, by invitation, read a study based upon a series of 37 cases from the outdoor and indoor service of the Maternity Hospital of the Woman's Medical College of



Pennsylvania. Omitting 6 cases of silver reaction, 2 of very mild grade, there remain 31 cases. Of these 3 cases, or 9.67 per cent., were antepartum or intrauterine, the cases developing before birth; 13, or 41.93 per cent., were primary, the infection being received at birth, with symptoms developing in one to five days; and 15, or 48.38 per cent., were secondary, the cases appearing after the fifth day, and thus not due to birth infection. The antepartum variety is very rare unless we include cases in which the disease develops within a few hours of birth. It is explained by the entrance of infection when the membranes have been long ruptured or by infection passing into the amniotic sac.

The proportion of cases of ophthalmia due to the gonococcus is estimated at from 41 to 72 per cent. In this series nearly five-sixths were clinically gonorrheal, but only a little over half in which microscopic examinations were made gave positive results. Male and female children were affected with about equal frequency—16 and 15 cases respectively. The virulence of the infection in the mother bears no relation to the severity of the disease in the child. These babies usually gain so well on breastfeeding that it is not advisable to separate the child from the mother unless there is special danger of reinfection through her.

The prophylactic treatment was the usual 1 per cent. silver nitrate solution, one drop in each eye, neutralized with normal salt solution and followed by boric acid. The outdoor results show 4 cases of gonorrheal ophthalmia (2 by bacteriologic examination) in 2,275 births—0.175 per cent. In the hospital there were 37 cases (23 by bacterial examination) in 950 births—2.84 per cent. Since in 3 cases the disease was present at birth and 14 were secondary cases, the prophylactic treatment failed in at most 10 cases, or 1.05 per cent. Although the secondary cases do not mean inefficient prophylaxis at birth, their number could be diminished by the repetition of some prophylactic treatment at intervals of two or three days, if the child's mother is known or suspected to have gonorrhea. Argyrol might be better in these cases because less irritating. The secondary cases are probably responsible for a certain percentage of the blindness dating from infancy and show the need of careful examination of the eyes during the first days of life, even when a prophylactic has been used. Much would be gained if this disease were reportable. The treatment consisted for the most part in the use of argyrol, supplemented by silver nitrate at need, hot and cold compresses

for the swollen lids, boric acid flushing and atropin. Vaccine was used in one case. The results were good, except in the case of one child, who died from uncontrollable hemorrhage from the conjunctiva of both eyes, perhaps a case of hemorrhagic disease of the newborn.

THE NON-OPERATIVE TREATMENT OF CONCOMITANT STRABISMUS  
IN CHILDHOOD.

DR. H. MAXWELL LANGDON, by invitation, read this paper. He said that deviation of the visual axes from parallelism is due, either to a paralysis of one or more ocular muscles or to a faulty development of some portion of the ocular apparatus. This may be faulty arrangement of an extra-ocular muscle, which is very rare; a disturbance of the relation existing between accommodation and convergence (Donder's theory), or a deficiency in the development of the power of fusing the image of each eye with that of the other, producing binocular single vision. The last is the theory of Claud Worth. Faulty arrangement of the extra-ocular muscles is very rare; the average child which develops a concomitant convergent strabismus is hyperopic, and in order to secure clear distance vision is compelled to use some of the power of accommodation, which should be reserved for near work, thereby destroying the intimate association between accommodation and convergence, being forced to over-accommodate for near and therefore over-converge. Worth finds that by the sixth month of life there are very evident signs of a beginning desire for binocular single vision, as shown by rotation of the eye before which a prism is placed and signs of displeasure at the diplopia produced. This fusion sense is fully developed by the sixth year in the average case, so if it is to be trained the attempt must be made before this time.

Squint is divided into two classes—unilateral, where one eye is used for fixation and the other kept continually converged, and alternating, where each eye is used indifferently. In the former the vision of the eye which is continually converged is very apt to deteriorate from disuse and the suppression of the image formed in it; this loss of vision is much less likely to occur in the alternating variety, since each eye has an opportunity to perform its function at different times. There are three things to be considered in a case of squint: First, the amount of the error of refraction, which should be corrected by proper

glasses not later than two years of age, should the squint appear before this, and at once should the squint appear later; second, the vision of each eye, since if the squint is unilateral, there is apt to be visual deficiency in the eye which is continually converged. To overcome this and increase the acuity of vision it is necessary to increase the use of this eye, by either completely stopping the use of the eye with better vision with a bandage or by instilling a cycloplegic and thereby annulling the accommodation and blurring all near objects. *A cycloplegic should not be used over an indefinite period to lessen the accommodation and convergence of each eye as it is very apt to cause a loss of vision in one eye.* Third, a deviation of the visual axes which is the cause of the most distress to the parents of the child is the most easily managed part of the difficulty, as it can be corrected at operation at any age, but a physiologic cure can only be made before the sixth year. At about three years of age some training of the fusion sense should be started with a Worth amblyoscope and continued until a satisfactory power of fusion is created.

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PSEUDOMALARIAL TYPES OF PYELITIS.—D. Vanderhoof (*Journal of American Medical Association*, April 20, 1912) states that of 47 cases of pyelitis which he had seen during the past five years, 21 had been treated for malaria. The clinical features of these two affections may be almost identical. The differentiation, however, is not difficult, but the confusion of the two conditions will continue until physicians realize that quinin is a specific in malaria, and that it is useless to continue this remedy if the febrile disturbance persists. Furthermore, quinin, even in moderate doses, is irritating to an infected kidney. The constitutional symptoms of a low-grade chronic infection of the genitourinary tract simulate pulmonary tuberculosis, but in the absence of cough the condition is often regarded as a chronic malaria. The urinary findings in these cases may appear almost insignificant, but a urine that is apparently clear on gross inspection will show the presence of a few pus-cells, often accompanied by an occasional red blood cell. Pyelitis is the cause of many unexplained fevers, and this is especially true in the case of young children.—*Medical Record*.



## CURRENT LITERATURE.

### ABSTRACTS IN THIS NUMBER BY

DR. T. WOOD-CLARKE.	DR. C. D. MARTINETTI.
DR. CHARLES E. FARR.	DR. WILLARD S. PARKER.
DR. S. FELDSTEIN.	DR. RICHARD M. SMITH.
DR. ALFRED F. HESS.	DR. S. W. THURBER.
DR. WILLIAM LYON.	DR. J. HERBERT YOUNG.

### PATHOLOGY.

RAVENNA, A.: SILVER NITRATE REACTION IN URINE OF INFANTS. (*Riv. di Clin. Ped.*, February, 1912.)

In a recent publication Engel and Turnan, German pediatricists, describe an interesting test which detects a difference between the urine of breast-fed babies and those receiving artificial food. To 5 c.c. of urine are added from 15 to 20 drops of 2 per cent. silver nitrate solution. A sediment forms, which within ten minutes becomes black if the infant be breast fed. The test ought to be made both at 212°F. and at ordinary temperature. If the sediment remains unaltered or slightly colored the child would be receiving other food than human milk. This matter during the last few months appears to have been discussed at length in German scientific circles. The author has undertaken experiments to satisfy himself as to the truth of the assertions made. He has tested urine of breast-fed infants, of others given a mixed form of nutrition, of some fed on cow's milk, vegetable compounds and milk modified according to Szekely's formula.

Results even after prolonged ebullition have been doubtful. Adding more reagent did not appear to make a difference. The cause of the change of colors of the sediment remains still obscure. It certainly does not depend upon the percentage of chlorides.

C. D. MARTINETTI.

EMERY, W. D'E.: ANAPHYLAXIS: (*British Medical Journal*, November 4, 1911, p. 1,178.)

The author presents an exhaustive discussion of the subject treated, first the early observations of the phenomenon and then discussing the condition in detail. Two essential factors are necessary for anaphylaxis: first, the introduction of a substance not normally occurring in the body, and, secondly, the occurrence of an interval varying in different cases, usually not less than one week before the introduction of a second dose of the same substance. The length of this incubation period depends upon the



species of animal, the nature of the sensitizing substance and on the dose. A large dose tends to delay the occurrence of the anaphylactic state. The rapidity of the appearance of the symptoms after the administration of the second dose depends mainly on the rapidity with which the serum is absorbed and gains access to the tissues in which it acts. The nature of the symptoms are not influenced to any great extent by the nature of the substance to which the animal is sensitized. The symptoms in general have reference to the nervous system, respiratory system, circulatory system, digestive system and the skin. The symptoms last but a short time and the animal either dies or recovers completely. The duration of the anaphylactic state may be extremely long, even several years. The dose necessary to produce sensitiveness is extremely small and the mode of injection, whether subcutaneous, intravenous, etc., is not of great importance. The nature of the substances which may produce anaphylactic state are all, or nearly all, proteins and probably ill defined nitrogenous bodies not definitely proteid in nature. Heat will destroy the sensitizing and reacting power of proteids in proportion as it coagulates or otherwise destroys them. Certain bacterial proteids, even if non-toxic, bring about anaphylaxis. An anaphylactic substance acts specifically, that is, the injection of a protein sensitizes the animal to that protein and to no others. Passive anaphylaxis may be produced by the injection of serum from an animal previously rendered hypersensitive in the usual way and the animal from which the serum which confers passive anaphylaxis is taken is not necessarily hypersensitive itself; that is, it may have had anti-anaphylaxis or the condition known as immunity. Anaphylactic shock may be avoided in sensitized animals either by specific or non-specific method. The non-specific method consists in the use of large doses of various hypnotics; the specific method by a series of injections of the sensitizing substance given at short intervals. Various theories of anaphylaxis are considered and most of them dismissed as unsatisfactory. It is definitely determined, however, that the phenomenon is intimately related to the formation of antibodies; that it is due directly to a combination of the antigen with the cells of the sensitized animals. Anaphylactic shock is probably dependent on the presence of sessile receptors in the cells, the combination of these with the antigen and the action of a complement. Further than this at the present time it is hardly pos-

sible to go. The author discusses the possible bearings of this phenomenon on practical medicine. He calls attention to the fact that urticaria is undoubtedly due to anaphylaxis and also the interesting observation that after a first injection of serum followed by serum disease there is often a previous history of asthma or hay fever. He does not believe in the intravenous injection of serum in patients who have had an injection previously, and in any case only when the symptoms of the disease for which the serum is given are so severe that delay might be fatal. He mentions the possibility that anaphylaxis may be of first importance in the development of infectious diseases in general and considers that there are such grave objections in the way of accepting such a theory of the pathology of infectious disease in general, mentioning especially that anaphylaxis is associated with low temperature, not fever, and is a transient phenomenon. He believes that the tuberculin hypersensitiveness must be regarded as a phenomenon closely related to, but not identical with, anaphylactic shock. He does not believe that anaphylaxis itself is of benefit to the individual, but is a necessary state to the development of immunity to toxins.

RICHARD M. SMITH.

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## SURGERY.

BARNES, HARRY A.: THE RELATION OF AGE TO TONSILLAR INFECTION. (*Annals of Otology, Rhinology and Laryngology*, December, 1911, p. 789.)

On histologic grounds the author explains why the tonsil of the infant under one year and the tonsil of the adult give rise to fewer infections than the tonsil of childhood. The invagination of the tonsillar crypts begins about the fourth fetal month and continues throughout the first year of infancy, and up to this period we find the crypts in all stages of development, *i.e.*, solid epithelial buds with no demarcation between central and outer cells; buds in which the central core has been formed but not expelled; and fully developed crypts. These changes are called intrinsic. Shortly after birth an extrinsic change begins to take place, and this is due to the action of lymphoid cells upon the epithelial lining of the crypts. As a result we finally have but a thin film of cells lining the crypts and these cells often suffer

from pressure and some of them degenerate, thus opening up spaces which are poor barriers to infectious material. This condition lasts until puberty, when there is a general increase of lymphoid activity which thickens the cryptic lining and produces a condition analogous to the infant type. Thus we see the infant tonsil offering little chance of infection; the tonsil of childhood in a condition of low resistance, poorly drained and offering a favorable nesting place for bacteria; then the tonsil of the adult regularly undergoing changes which render infection difficult, but which, when it persists as the type of childhood, is just as prone to disease as that of earlier years. The whole question, in the author's mind, revolves about the condition of the lining of the crypts.

S. W. THURBER.

WINSLOW, RANDOLPH: AMPUTATION FOR CONGENITAL GANGRENE. (*The Journal of the American Medical Association*, January 13, 1912, p. 139.)

Dr. Winslow reported a case of congenital gangrene of the right forearm in a five-days-old infant. No anesthetic was used, although it is possible that the child might have taken it without trouble. The attending physician stated that there was no pressure by the cord nor were any bands present. The gangrene was of the obstructive or moist type, rather than the dry. The forearm and hand were swollen, discolored and offensive. The outcome was successful.

CHARLES E. FARR.

DOWD, CHARLES N.: SOME DIFFERENCES BETWEEN THE SURGERY OF CHILDREN AND ADULTS. (*Surgery, Gynecology and Obstetrics*, April, 1912, p. 353.)

Dowd's paper is confined to three subjects—tubercular cervical adenitis, empyema, and tubercular peritonitis. Of the first subject he states: (a) Children under two years of age do not often have tubercular cervical adenitis; when they do have it they usually show less resistance than older children. (b) Between the ages of two and seventeen the disease is fairly regular and definite in its course, nearly as much so as typhoid and pneumonia. The upper nodes are involved first, and usually break down before the lower nodes are extensively involved. (c) In adult life the breaking down of the upper nodes is not so likely to occur; the infection spreads downward and involves the lower



nodes, thus presenting a clinical picture and a problem different from that in children. Of the author's 465 cases, only 15 were below the age of two. Two of these died within six months of the operation, 1 case was lost sight of and 12 were found in good condition, although 2 of them had lupus spots. Ten of the cases had very extensive nodes on admission, 4 of them on both sides of the neck. Six of them had already had incomplete operations, while five had open ulcers or sinuses. Four of them had recently had bronchopneumonia or severe bronchitis, possibly of tubercular origin. Eight had various complications, such as retropharyngeal abscess, tuberculous adenoids, spinaventosa, lupus of forehead, and phylcentenular ophthalmia. Certainly the results attained in this group were remarkably good.

Of group *b*, 80 per cent. of the total, there were about 320 cases, or 85 per cent., which presented, for the most part, a cold abscess below the angle of the jaw and a moderate number of tubercular nodes at the upper end of the chain. The operation is fairly easy to perform and the scar, if properly placed, is scarcely visible. There was but one operative death: a permanent recovery in about 90 per cent. of the cases.

In group *c* the condition is more serious, there is less likelihood of spontaneous limitation of the disease and the operation is much more difficult. There were 78 of these cases, of whom 54 showed this widespread disease. The results have not been quite as good as in the last two groups. There was one death, apparently from pulmonary embolus.

*Empyema.*—Of the 204 cases, 94 per cent. followed pneumonia, about 50 per cent. healed within three months of the operation, 30 per cent. died and 19 per cent. showed delayed healing. Twenty autopsies were obtained, of which 13 showed pneumonia still present, 5 had pneumococcus peritonitis, 1 pneumococcus meningitis, 4 pericarditis, 3 tuberculosis, 5 contracted lung. One case showed an undrained pocket of pus and 5 others showed very small spots of beginning empyema along with a pneumonia. Dowd warns against too vigorous use of aspirating needles and too much operating and searching for pus pockets, as these patients are really suffering from pneumonia, peritonitis, etc., rather than empyema. Cultures showed pneumococci 52 times, streptococci 6 times, no growth 9 times. The pus is almost invariably greenish white, fairly thick and contains coagulæ. In the adults, on the other hand, of which there



are 40 cases, the fluid was thin in 15 and had a foul odor in 11. Eight cases showed pneumococci, 6 streptococci, 3 staphylococci, 1 showed mixed infection and 7 no growth. Tuberculous empyema is more common among the adults and the power of healing is much less.

*Tuberculous peritonitis.*—There were 46 of these cases in children and 30 in adults. In only 7 of the children was fluid present in marked degree, and in only 4 was any one organ particularly involved, the appendix, which was removed, but the results were disappointing. Most of the cases in children were very far advanced and some were inoperable. Several, however, showed marked improvement after operation, especially as regards the thickened omentum. Eight cases are known to be in excellent condition from one to seven years after operation. In the adult cases there were 12 who had large amounts of peritoneal fluid, 6 from whom portions of intestines were excised, and 9 from whom portions of the pelvic organs were removed. The author concludes that children are more apt than adults to have the form of tubercular peritonitis which spreads insidiously, so as to involve a very large part of the peritoneum, and which does not give a large percentage of localized disease.

CHARLES E. FARR.

HOMANS, JOHN: OSTEOMYELITIS OF THE LONG BONES. (*Annals of Surgery*, March, 1912, p. 375.)

Of the 94 cases from the Children's Hospital, Boston, Mass., 7 died from the immediate effects of the disease, 40 are well and have a perfect functional result (3 with multiple infections), 9 were lost sight of but were reported as healed and in good condition, 11 were healed with some deformity but without disability, 7 are unhealed at present, 20 were unheard from after leaving the hospital.

The great bulk of the infections are medullary in origin and their primary focus is found near the epiphyseal line. There were 40 cases in the femur, 24 at the upper end, 15 at the lower end and 1 of unknown origin. Of the 34 tibia cases 12 were at the upper end, 19 at the lower end and 3 of unknown origin. The fibula cases showed 3 at the upper, 4 at the lower end. The 9 humerus cases all began at the upper end. There were 6 cases in the radius, 4 at the lower end and two of unknown origin, 1

each at the upper and lower end of the ulna, and two at the inner end of the clavicle. Homans' conclusions are: (1) Osteomyelitis of the long bones in children originates in the ends of the diaphyses, rarely as a periostitis; (2) it principally attacks the weight-bearing bones; (3) the early or primary operation demands the removal of bone for purposes of drainage only. The infected medulla should be fully uncovered without doing unnecessary damage to the periosteum or endosteum; (4) considering the power of regeneration of periosteum plus endosteum, early complete resection of a shaft is not advisable; therefore total resection later should be reserved for cases of total necrosis; (5) the X-ray cannot be depended on for diagnosis in the very early stages, but is invaluable in following the course of the disease.

CHARLES E. FARR.

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### MEDICINE.

MULLER, E.: THE SERODIAGNOSIS OF EPIDEMIC INFANTILE PARALYSIS. (*Deutsch. Med. Woch.*, No. 37, p. 1,105.)

The author outlines a method for the diagnosis of poliomyelitis. However, although it is of interest in that it proves the presence of antibodies in the blood, it is not of immediate practical importance, as it consists of the neutralization of the virus by the spinal cords of affected monkeys—a method not suited to general application. Of interest are 3 cases of herpes zoster which Müller found to give a positive serum reaction. He also states that herpes cases are unusually frequent during the period of epidemics of this disease. In view of the fact that the lesion of herpes zoster is now commonly referred to the spinal cord, this clinical and laboratory observation has especial interest.

ALFRED F. HESS.

AUBERTIN, C.: SLOWING OF THE RESPIRATION DUE TO ENLARGED BRONCHIAL GLANDS. (RALENTISSEMENT DE LA RESPIRATION DANS L'ADÉNOPATHIE TRACHÉO-BRONCHIQUE.) (*Rev. d'Hyg. et de Méd. Infant.*, 1911, Vol. X., p. 419.)

Aubertin reports the case of a child thirteen years old who showed enlarged bronchial glands on the left, a neuralgia of the left phrenic nerve and a regular, permanent and painless slowing of respiration to six or eight minutes. The only subjective

symptom was precordial pain. The heart and lungs were normal. Radioscopic examination showed the enlarged bronchial glands but no evidence of diaphragmatic pleurisy nor paralysis of the diaphragm. The author believes that the above symptoms were due to irritation of the left phrenic nerve by the enlarged bronchial glands, without sufficient compression, however, to cause paralysis of the diaphragm.

J. HERBERT YOUNG.

PLAUCHU, E., AND RENDU, R.: STUDY OF THE FAT IN BREAST MILK. (ETUDE DU BEURRE DANS LE LAIT DE FEMME PAR LA CENTRIFUGATION.) (*La Péd. Prat.*, January 25, 1912, p. 44.)

From an analysis of 3,450 specimens of breast milk from 46 women, the authors reach the following conclusions: (1) Specimens of breast milk taken daily under exactly the same conditions show a decided variation from day to day in the percentage of fat. This variation is not due to variations in the amount of milk. The average daily variation was 6.21 gms. of fat per kilo. The woman showed a variation of 28.86 gms. per kilo. on successive days. (2) The average fat content of breast milk taken at the beginning of nursing is 34.05 gms. per kilo. (Minimum, 14.63 gms.; maximum, 52.5 gms.) (3) The number of pregnancies and the age of the mother has but little influence on the amount of fat. (4) The amount of fat diminishes in the first fifteen or twenty days; this is synchronous with an increase in the amount of milk. (5) The larger the amount of milk the lower the percentage of fat. (6) Morning milk is richer in fat than evening milk. (7) Milk at the end of nursing is richer in fat than at the beginning. (8) When the breasts are of unequal size the milk of the smaller contains a larger percentage of fat. (9) The addition of a large amount of fat or carbohydrate to the diet has no effect on the amount of fat in the milk. (10) Drugs (galactogogues) do not increase the quantity or quality of the milk. (11) Menstruation has no effect on the fat content of the milk.

J. HERBERT YOUNG.

FREEMAN, R. G.: INTESTINAL INFANTILISM OF HERTER. (*American Journal of Children's Diseases*, 1911, Vol. 11, p. 332.)

The author discusses the condition of intestinal infantilism and reports 4 cases. The essential characteristics of this disease are an arrested development of the body, marked abdominal dis-



tention, moderate anemia and marked fatigue and tendency to looseness of the bowels with excessive appetite and thirst and increased secretion of urine, usually cold hands and feet. Examination of feces shows an absence of ordinary bacterial flora. The organisms found are gram-positive, the bacillus bifidus being most prominent and having associated with it the bacillus acidophilus and bacillus infantilis. There is an excess of fat in the form of soaps and fatty acids. The urine shows a rise in ethereal sulphates, pronounced indicanuria, and large amounts of aromatic oxyacids. The nature of this disease is unknown. The author thinks it is due to some damage to the part of the digestive system which has to do with the absorption of fat.

RICHARD M. SMITH.

FILI-BOUAZZOLA, A.: TRANSITORY SPINAL PARALYSIS IN CHILDREN. (*Riv. di Clin. Ped.*, July, 1911.)

There is a well-defined form of transitory spinal paralysis whose duration ranges from a few days to several weeks. These cases recover completely without treatment. This form, similarly to what takes place in anterior poliomyelitis, Bouazzola has demonstrated to exist epidermically.

C. D. MARTINETTI.

FAIRBANKS, ARTHUR WILLARD: A CASE OF CEREBRAL SYPHILIS IN A CHILD FOUR AND ONE-HALF YEARS CURED BY SALVARSAN. (*Boston Medical and Surgical Journal*, October 12, 1911, p. 568.)

Child of syphilitic parents, first signs of lues at two weeks, cerebral symptoms at thirteen months with convulsions and left-side hemiplegia, which improved under treatment, but became worse at twenty-seven months, with rapid mental deterioration.

At three and one-half years, when he came under Dr. Fairbanks' care, he was having as many as seven petit mal and two grand mal attacks in one hour. Intensive mercurial and iodid treatment gave some mental improvement and fewer convulsions, but suddenly attacks increased to twenty-five or thirty daily. Inunctions and increase of K. I. from 48 grains to 57 grains daily gave only moderate improvement. All treatment stopped for four weeks preceding the giving of 0.3 grain salvarsan by gluteal injection. One momentary syncopal attack occurred one week after injection, but none later. From this



time mental improvement was rapid, and seven months after child seems normal except for slight lameness of left leg and some awkwardness in use of left arm. At two and seven months after injection Wassermann was negative.

The author considers this result ample justification for use of salvarsan in brain syphilis and urges its prompt use to avoid the often irreparable structural damage which may occur even during intensive mercurial and iodid treatment.

WILLIAM LYON.

POUCHER, CHARLES: DAILY USE OF LACTOSE IN INFANT FEEDING. (*Archiv. de Méd. des Enf.*, No. 2, 1911.)

Lactose may be used daily in infant feeding, and the various grades on the market give approximately the same results. From 15 to 30 grams daily may be given. After two years of age the utility of this diet ceases. The initial dosage of lactose should be carefully determined, for children differ in their tolerance of this drug. Its laxative effect is pronounced and free from untoward effects.

C. D. MARTINETTI.

LANGMEAD, FREDERICK, M.D., LONDON, M.R.C.P., LONDON: ACUTE RHEUMATISM AMONG CHILDREN. AN INQUIRY INTO THE PREVALENCE OF ACUTE RHEUMATISM AND ITS CONSEQUENCES AMONG CHILDREN OF SCHOOL AGE. (*The Lancet*, October 21, 1911, p. 1133.)

Without in any sense being selected, 2,556 children were examined, 1,782 between six and one-half and fourteen years, 874 from three to six and one-half years. Each child was stripped to the waist, thorough examination of heart and throat made and other evidences of rheumatism looked for. Complete history elicited in all cases; 133 children were found definitely rheumatic, the percentage being one-third greater from six and one-half to fourteen years.

Eighty-seven per cent. of these children had definite cardiac involvement, mitral disease occurring in 59 per cent., aortic regurgitation but once.

Disease of the tonsil warranting operation appeared in 28 per cent., or about four times as frequently as in the general average of school children.

Polysynovitis had been present in 31 per cent. chorea in 13.5

per cent., twice as many girls being affected as boys; 26 per cent. had growing pains. From this inquiry it is evident that there is a large amount of disregarded rheumatism among school children in London, as about  $7\frac{1}{2}$  per cent. of the children between seven and fourteen years, and supposed to be well, are rheumatic.

A careful routine examination by competent medical officers would bring these cases to light and aid in instituting timely treatment in early cases and help in selecting a proper vocation and method of life for those who have acquired incurable defects.

WILLIAM LYON.

FIRTH, A. C. D.: ENURESIS AND THYROID EXTRACT. (*The Lancet*, December 9, 1911, p. 1,619.)

Twenty-eight children suffering from enuresis were treated with thyroid extract in doses varying from  $\frac{1}{4}$  to  $1\frac{1}{2}$  grams per day. In the cases no other treatment was instituted, and no operative procedures performed and no changes made in habits of life. Sixteen cases showed marked improvement or were cured and 12 did not improve at all. Twelve of the 16 cases which improved were mentally backward, while but 2 of the 12 cases which did not improve were deficient. The best results were obtained in cases where the enuresis had persisted from birth and the parents also were backward. No relation between enuresis and tonsil and adenoid operation could be discovered. The author thinks quite as good results are obtained by systematic treatment with atropin as with thyroid extract.

T. WOOD CLARKE.

SSÓKOLOW, D.: THYMIC DEATH AND THYMIC ASTHMA IN CHILDREN. (MORS THYMICA ET ASTHMA THYMICUM BEI KINDERN.) (*Archiv. für Kinderh.*, Stuttgart, November, 1911.)

The author analyzes 101 cases in the literature of deaths from an enlarged thymus and says that many cases are attributed improperly to this cause. The mere weight of an enlarged thymus has been proven experimentally insufficient to compress the trachea to the point of asphyxiation, and, moreover, in children the elasticity of the chest walls and of the surrounding soft parts would prevent any great degree of compression. He believes that there is an internal secretion of the thymus and that the slow increase of this secretion or some other

harmful product of the gland slowly intoxicates the system and finally overwhelms it. The sudden deaths then are due to a paralysis of the heart or of the respiratory center. The diagnosis of enlarged thymus is difficult, as radiographs and dullness on percussion give the same findings in tubercular mediastinal or bronchial lymph nodes. Thymic asthma is hard to differentiate from capillary bronchitis, but is characterized chiefly by dyspnea during expiration. Ssokolow tabulates and analyzes a large series of cases which were operated upon by tracheotomy, by intubation and by excision, and reports his own experimental work. His belief is that the thymus is of essential importance for the growing child, its internal secretion being necessary for normal growth, but that its functions in part can be assumed by other organs.

CHARLES E. FARR.

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#### THERAPEUTICS.

WELDE, E.: SALVARSAN IN CONGENITAL LUES. (*Jahrb. für Kinderhk.*, January 5, 1912, p. 56.)

Twenty-eight cases were treated by the author, most of whom remained under observation for one-half to three-quarters of a year. At first, 1 to 3 c.c. of an Alt's solution or oil suspension were given subcutaneously in the interscapular region. In all but 1 of the cases infiltration and necrosis resulted. Intramuscular injections given at a later period were also followed by infiltrations and necrosis, but were less marked than with the subcutaneous method of injection. In the last 10 cases an attempt (not always successful) was made to introduce the drug intravenously. The use of the arm veins was soon abandoned, as introduction into the veins of the scalp was found to be attended with less difficulty. Extravasation about the veins was not rare, but only once did phlegmon of the head result. At first, 0.008 to 0.01 per kilo of body weight were given. More recently, each child received 0.1 of the drug. In 10 cases the injection was repeated once or twice. The largest total dose was 0.25. Within six to eight hours of the injection the temperature rose to 38° or 39.8° C. It became normal again in twelve to twenty-four hours. The general condition was not affected, and collapse was not seen. In a few cases, moderate diarrhea was present for

one to two days. Vomiting occurred in 2 cases. The Herxheimer reaction (temporary hyperemia of the skin eruption) was seen in a few cases. The result of the injection became evident within a few days, when the eruption began to fade. The fading was usually so rapid that within eight to ten days only pigmented spots could be seen. Ulcerative processes in the mouth and nose, rhagades and moist papules dried up rapidly. The snuffle improved markedly, but never wholly disappeared. The characteristic pale yellow complexion was soon replaced by a healthy color. The effect on the visceral symptoms was much less striking. A case of cerebral lues was not benefited in the least, and of 2 cases of Parrot's pseudoparalysis only 1 showed improvement.

The Wassermann reaction, with the exception of one case (with temporary disappearance of the reaction) always remained positive. In 2 cases a recurrence of the skin eruption was seen. In no case did permanent injury result from this treatment.

While his results were very good the author thinks they were not superior to those obtained with mercury and iodids. The shortness of the time does not permit us to say whether the cures were permanent. With greater knowledge of the conditions determining the absorption of the drug and its proper dosage, we may hope to accomplish permanent results. S. FELDSTEIN.

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### INFANT FEEDING.

KOSSEL, H.: THE RELATION OF HUMAN AND BOVINE TUBERCULOSIS. (*Deutsch. Med. Woch.*, April 18, 1912, p. 740.)

At the International Tuberculosis Congress in Rome, Kossel presented a full report upon the above subject. This is of great interest, as it represents the revised opinion of Koch, given at the last International Congress, at Washington, three years ago. His conclusions, based on a study of about 1,600 cultures of tubercle bacilli gathered from all sources, are as follows:—

(1) Determining the type of a tubercle bacillus allows us to state the source of infection in a given case.

(2) Pulmonary tuberculosis in man is, with rare exceptions, caused by the human type of tubercle bacillus.

(3) The source of infection in pulmonary tuberculosis is almost entirely through tuberculous individuals.



(4) The infection with the bovine type of bacilli, through milk or meat, plays a secondary rôle in the spread of tuberculosis in man.

(5) Success in combating tuberculosis is only to be hoped for by preventing or limiting infection from persons to persons.

This summary shows that all countries are now practically unanimous on the relation of bovine and human tuberculosis to man. Koch's statement that bovine tuberculosis is not transmissible to man cannot be accepted as absolutely correct. The only point of difference is as to the exact percentage of infection to be attributed to the invasion of the bovine bacillus.

ALFRED F. HESS.

YOUNG, J. HERBERT: A CARD FOR THE RAPID CALCULATION OF MILK MODIFICATIONS. (*Boston Medical and Surgical Journal*, March 7, 1912, p. 372.)

Young's milk modification card consists of a celluloid envelope 5 inches long and 3 inches wide, open at the top, containing two celluloid cards. Upon both sides of these cards are printed the figures necessary for the preparation of 20, 32, 40 and 48 ounce mixtures. The front of the envelope is divided into four sections, headed "fat," "proteid," "sugar" and "whey," with subheadings of "percentage desired" and "number of ounces" of the various ingredients. Above these subheadings are perforations through which figures on the card are read. By

MILK MODIFICATION CARD. <small>BY JAMES HERBERT YOUNG, M. D.</small>															
FAT						PROTEID			SUGAR		WHEY				
30		40		45		10		1		14		15		7	
% Desired	Number Ounces 16% Cream	Number	Calories	% Desired	Number Ounces Skimmed Milk and Cream	Number	Calories	Number Ounces Skimmed Milk and Cream	% of Sugar	Number Ounces of Whey	% of Sugar	Number Calories			
<p>16% CREAM: Let the milk stand until the cream rises and then remove ALL this cream. This gravity cream, usually about 6 ounces on a quart, contains approximately 16% fat.</p>															
<p>1 level tablespoon of milk sugar increases the total percentage of sugar</p>															
2.00% in a 20 ounce mixture.						1.00% in a 40 ounce mixture.									
1.20 " 32 " " "						.60 " 48 " " "									
<p>The calorimetric value of 1 level tablespoon of milk sugar = 48 calories.</p>															
<p><small>Copyrighted and Published 1911, by F. H. THOMAS CO., 891 Bejleton St., Boston, Mass.</small></p>															

pushing the cards up or down until the desired percentage shows in the proper column, the number of ounces of cream or milk needed may be found in the next column. The amount of milk sugar necessary to obtain the desired percentage can be calculated from a table on the front of the envelope. Whey mixtures, as well as milk and cream mixtures, may be calculated from the card. The caloric value of any formula may be determined by the simple process of addition.

WILLARD S. PARKER.

DE CASTRO, R.: MENSTRUATION AND NURSING. (*La Med. de los Niños*, December, 1910.)

De Castro had under observation 390 women who menstruated whilst nursing. The quantity of milk diminished in 36 only, increased in 5 cases and remained the same in 348. Only two of the babies showed slight digestive disturbances at the appearance of menses. The majority of the women (presumably Spanish), especially those who had one child already and the primiparæ, menstruated regularly from the first months of nursing.

C. D. MARTINETTI.

MORSE, JOHN LOVETT: ON THE USE OF MALT SUGAR AND HIGH PERCENTAGES OF CASEIN IN INFANT FEEDING. (*American Journal of Diseases of Children*, 1911, Vol. II., p. 313.)

After discussing the literature of the subject and the theory upon which the feeding of sugar and casein has been undertaken, the author cites experience in the use of a formula containing high percentages of maltose and precipitated casein. These mixtures were made by the use of the cream containing a high percentage of fat with the addition of precipitated casein and maltose. Precipitated casein was prepared according to the Finkelstein and Meyer method, casein from one quart of milk being made into an emulsion with sufficient water to make one pint. This contained less than 5 per cent. of sugar. The maltose used contained 88 per cent. carbohydrates, 57.1 per cent. being in the form of maltose and 30.9 per cent. in the form of dextrin. The method of treatment with these mixtures was tried in cases of intestinal disturbance associated with evidence of fermentation in which there was no vomiting. Sixteen cases were tried, but only 8 of them could be carefully studied. The author believes that the method of treating intestinal disturbances associated with fermentation by the withdrawal of lactose and raising the percentage of casein followed by the ad-

dition of dextri-maltose is a valuable procedure. He thinks, also, it is possible that the precipitated casein freed from the whey proteins has some advantage over natural milk proteins. He is also inclined to think that after the symptoms of fermentation are relieved babies do not thrive as well on these mixtures as on ordinary mixtures, and consequently believes they should be discontinued. The method is not one of general application.

RICHARD M. SMITH.

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## BOOK REVIEW.

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TECHNIQUE CHIRURGICALE INFANTILE. INDICATIONS OPÉRATOIRES OPÉRATIONS COURANTES. Par Le Dr. L. OMBRÉDANNE, Professeur Agrégé à la Faculté de Médecine de Paris, Chirurgien de L'Hopital Bretonneau. Avec 210 figures dans le texte. Masson et Cie Editeurs Libraires de l'Académie de Médecine. 120, Boulevard Saint-Germain, Paris. 1912.

This manual of operative surgery is a well written and very useful book for the purpose for which it was intended by the author, namely, the instruction of students, and more especially hospital internes, in the author's especial technic. It has all of the strength and few of the weaknesses of the one-man book, and, considering the size of the field to be covered, the book is fairly complete. The illustrations, although schematic in character, are very good and quite numerous. There is nothing particularly new in the book, but the chapters on oral surgery, genitourinary surgery and the surgery of club foot are very well written, although the views expressed by the author differ considerably from the accepted practice in this country. A few of the weak points, according to our views, are seen in the treatment of fractures, nose and throat surgery, and in the treatment of tuberculous glands of the neck. The use of the seton for cervical abscess seems to us a return to prehistoric surgery, and the author's treatment of appendicitis seems about ten years behind our own, as he waits for abscesses to ripen, makes large incisions, irrigates and puts in very large drains. However, taken as a whole and considering the limitations put upon it by the author himself, the book is well worth reading, not only by the student, but by anyone interested in the difficult subject of the surgery of childhood.

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## EDITORIAL.

### PUTREFACTIVE DIARRHEA AND THE BULGARIAN BACILLUS.

The treatment of the putrefactive diarrheas of summer by the use of lactic acid producing bacteria to change the character of the intestinal flora and the reaction of the intestinal contents as advocated by Metchnikoff and his school, was tried in this country in 1907, 1908 and 1909 without much success. A number of observers reported series of cases in which the attempt had been made to implant a living culture of such organisms, but in which little of advantage seemed to have been gained. Whether the attempt was made by using ripened milk, or tablets supposed to contain the bacteria, or suspensions of cultures of such bacteria or growths in malt, the reports were not sufficiently favorable to bring the method into a general therapeutic application. Those who did use the bacteria seldom had the courage in the face of the apparently negative results and the increasing illness of the children to persist in most of their cases for the



length of time declared necessary by the advocates of the method, and it was felt generally that those who had advocated the use of these bacterial preparations had been carried away by their enthusiasm.

Subsequently, the use of Finkelstein's *eiweissmilch*, which makes use of soured milk, has come into quite general use as a valuable therapeutic aid in diarrheal conditions, not so much, perhaps, in its original form, made from whole milk, as when made from skim milk and using in the place of buttermilk, skim milk, "ripened" by the use of pure cultures of the Bulgarian bacillus.

Recently an article by Clock\* has renewed the interest in the use of the Bulgarian bacillus in summer diarrhea, and has perhaps indicated what was the cause of failure in previous attempts in America.

Dr. Clock reported in detail 8 cases of a large series of cases, in which the only treatment was the administration of tablets containing a pure culture of the *B. lactis Bulgaricus*. The particular tablets used in this instance are apparently the only ones which have been found to contain strongly viable organisms, so that when introduced into the body the bacteria will grow and become domiciled in the intestinal tract. It may be that the lack of such a culture was the cause of the indifferent results which obtained in previous years and led to the neglect of the method here, and that with the application of the newer preparation, American pediatricists may come into agreement with their French colleagues.

It takes considerable experience with this new therapy for diarrhea for one to acquire the fortitude to continue to feed children who have green, slimy, loose stools with blood and tenesmus, who show considerable emaciation and fever, on their regular milk mixtures or on their regular mixtures slightly diluted. Such a procedure is advocated, and by such a procedure some very marvellous results have undoubtedly been ob-

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\* *Journal of American Medical Association*, June 29, 1912; *ARCHIVES*, May, 1912, p. 378.

tained. It is rather a shock, however, to one who has believed thoroughly that the first thing to do in diarrhea is to stop milk and give a cathartic, to change about entirely and, instead of his eager catharsis, give merely two white, sugar-like tablets every two hours or so. Nor would even an enthusiast recommend such a procedure in all cases; for some are too profoundly poisoned to permit of a waiting game and too shocked to be able to digest and assimilate even a diluted milk food. But when one sees several cases in which such wicked stools gradually become yellow, less frequent, with less blood and mucus, and finally are normal and formed in the course of five or six days, with the child improving in general condition, the fever subsiding, and the weight remaining stationary or even *increasing*, his confidence grows and he is more and more willing to persist in the treatment through the first three or four anxious days. This lack of courage undoubtedly contributed to the little success in earlier series, as it undoubtedly did in the first attempts to use *eisweissmilch* in diarrheal cases.

It has been urged that this method of treatment does not produce any more rapid cures than did the older way of purging, cereal water or tea diet and astringents of the type of bismuth and the tannin preparations; that in a week the frequent stools should be cured, and that such is not the case with the use of lactic acid bacilli. It may be that we should reverse our conception of diarrheal diseases somewhat. Many years ago we saw light and realized that diarrhea was not in itself the evil we had to attack, but the expression of some internal irritation, and instead of paregoric and Trs. kino and catechu, castor oil and thorough cleansing were advocated. Only after a thorough subsidence of unfavorable symptoms, when the bowel continued to be sensitive and peristalsis to be awakened by every ingestion of food so that a number of movements resulted, were astringents brought into play. The idea that milk should be eliminated from the diet in diarrhea has undoubtedly resulted in quicker cures, although the argument that it should be eliminated because it is a good culture medium does not con-

sider whether it necessarily reaches the site of the disease in such a form as to continue to be a culture medium. Nor are the digestive powers in fever so lowered as to prevent the digestion of milk in such conditions as typhoid fever, where the high calory diet, which includes a large amount of milk, has been accompanied by reduced death and complication rates. And it may be added as a corollary that if milk really be a good culture medium it will help the antiputrefactive *B. lactis Bulgaricus* to attain a virile maturity.

The true criteria for judging the success of a treatment of diarrhea are the rapidity of the improvement in the general condition, the rapidity of the subsidence of fever, the rapidity of the return of stools to normal color and consistence, the maintenance of body weight or the rapid return to the previous weight. Judged by the first three of these criteria the lactic acid bacillus treatment compares very favorably with previous methods; in the last it excels them. We commonly see as great a loss as 15 ounces a day in the ordinary case of diarrhea by the ordinary treatment. That such a loss contributes to the mortality percentage through weakened resistance is highly probable and seems absolutely certain to anyone who has seen the difference in typhoid fever under starvation and under high calory diets and diarrhea under starvation and under a good diet plus the Bulgarian bacillus. As to the number of stools, why should we mind five or six yellow, soft movements a day if the child seems well and gains in weight?

This method of handling the putrefactive diarrheas of summer has in it much of promise, both from a rational and from an empiric standpoint. It requires the extended experience of many observers to finally establish its therapeutic value; but in view of the striking results which a number of physicians have obtained, using it as the sole remedy, such reports as may detail unfavorable results should not be taken too seriously unless their authors can demonstrate a consistent and thorough use of the bacilli. Now that a satisfactory preparation is available, the previous experience need not, perhaps, be repeated.

## ORIGINAL COMMUNICATIONS.

### TYPHOID FEVER IN INFANCY. AN ANALYSIS OF 75 CASES.\*

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In a contribution published about ten years ago in collaboration with Dr. Maurice Ostheimer (*American Journal of the Medical Sciences*, November, 1902), a study was made of all the published cases of typhoid fever occurring in the first two and one-half years of life, so far as we could find references to them. In this report we included synopses of 18 cases, the majority of which had been under my personal care; the remainder being unpublished cases in the practice of colleagues. To these 18 cases as a nucleus I have added such others as have come under my observation in hospital or private practice, or are found in the records of my colleagues at the Children's Hospital. The total equals 75 cases in all, more than one-half of the number having been under my personal care. The series is much larger than any individual one previously published, as far as I am aware, and it is hoped may be correspondingly useful.

The possibility of making an entirely complete percentage analysis is interfered with by various circumstances, such as lack of accurate medical knowledge of the onset, especially of the hospital cases, the meagre character of a few of the hospital case-histories, the lack of details obtainable in some of the cases seen in consultation, etc. This does not hinder, however, the drawing of serviceable general conclusions, and even the giving of many statistical analyses.

*Age of the Patients.*—The age limit was fixed at two and one-half years. This is in a way arbitrary, as the termination of infancy is better placed at two years, the first six months of the third year belonging to the period of early childhood, which extends to the age of six years. The limit of two and one-half years was adopted chiefly because in the first half of the third year the general characteristics of the second year of life are

\* Read before the Annual Meeting of the American Pediatric Society, Hot Springs, Va., May 29-31, 1912.



still well marked; partly because after two and one-half years the cases of typhoid fever multiplied so rapidly that the number became inconveniently large, and partly because in the former article on this subject already referred to this age limit had been chosen. Any references in this contribution to "infancy" will therefore indicate the first two and one-half years of life, "early childhood" denoting the time from the close of this period to the age of six years.

In the present series 9 of the patients (12 per cent.) were one year or less of age, the exact figures being: three months, 1 case; five months, 1 case; seven months, 1 case; nine months, 2 cases; ten months, 1 case; eleven months, 2 cases; one year, 1 case. From this age up to and including that of two years there were 36 cases (48 per cent.); and 30 cases (40 per cent.) of over two years up to two and one-half years. An unduly large proportion were recorded as "two years" or "two and one-half years" old—12 cases and 13 cases respectively. This is because these figures are in a sense an approximate statement on the part of the parents, who failed to give the exact number of months. This applies with especial force to the earlier cases studied. In the later ones the case-histories include a statement of the date of birth, and the criticism, therefore, holds good only in a small proportion.

*Race.*—65 (86.67 per cent.) of the children were white; 10 (13.33 per cent.) colored.

*Family History.*—In only 16 cases (21.33 per cent.) was the disease existent in other members of the family—one of these being five months of age, one nine months, one fifteen months, one seventeen months, one eighteen months, one twenty-one months; one twenty-three months and the remainder two years or over. This indicates that the statement which has sometimes been made, that it is particularly in family epidemics that infants are attacked, certainly does not apply to this series, since in 78.66 per cent. of the children no other case occurred in the family.

*Onset.*—The *duration of the onset* was determined by the development of spots when this was known, or in some cases by the evident attaining of the fastigium before the appearance of spots was noted. In cases first coming under observation on what was stated to be the eighth day of the disease the duration could not be determined accurately, as the temperature seemed

in nearly all of these to be already at its height; and if the roseola was already present, as was true in nine instances, it could be concluded only that the onset had not lasted *over* a week; it might readily have been less than this. Some instances of early observation gave positive evidence of the short duration possible. Thus we see, as marked by the fever reaching its height, the onset lasting in 4 cases, two days; 3 cases, three days; 5 cases, four days; 9 cases, five days; 11 cases, six days or less; 12 cases, seven days or less. In at least 44 cases, therefore—58.67 per cent. of the total number—the onset lasted not over seven days, and in at least 21 (28 per cent.) not over five days. In the remaining cases the date of the first observation was not early enough to allow of conclusions.

The *method of onset* could be studied in 59 patients. In the remaining 16 there were not sufficient data to allow of conclusions being formed. There was reason to believe the onset *sudden* in at least 21 of the 59 (35.59 per cent.). In these the symptoms came on in force upon the first day, and the child was clearly acutely ill. In 16 others (27.12 per cent.) the onset could be called *rapid*. These together make 37 of the 59 cases (62.71 per cent.) in which there was a rapid development of very decidedly threatening symptoms. In 22 cases (37.29 per cent.) the onset appeared more gradual.

We are then justified in concluding that there is a peculiar tendency in infancy for the onset to be sudden or rapid in its development and short in its course.

*The symptoms of the onset* may be considered in some detail, as shown by cases where statements were sufficiently complete to permit of analysis:—

*Fever.*—The reports show this mentioned in 57 cases. By fever is meant in most instances such a degree of elevation of temperature as the parents could themselves recognize, without using a thermometer, which would naturally have shown fever in all cases. In those cases where early study was possible the temperature was found to rise rapidly, reaching its height much sooner than in adult life, as has already been pointed out. Probably the majority of cases would show the fever at its height in from three to four days if observation from the beginning had been possible.

*Diarrhea.*—There is a much greater tendency to diarrhea during the onset in infancy than is seen in typhoid fever in early

or later childhood. In 43 cases (57.33 per cent.) this symptom was reported. In 7 others there was constipation, and in 7 the bowels were undisturbed. In the remaining no statement is made and diarrhea doubtless was not a prominent symptom if present.

*Vomiting.*—This is a symptom to which infants are, of course, predisposed from slight causes. It is surprising to observe how frequently it was reported as an early symptom of typhoid fever at this period—26 cases in all (34.67 per cent.). In the others no mention is made of it. In a few it occurred but once or twice and may have been accidental, but in the remaining it was evidently a marked symptom, and in some was the principal one.

*Malaise or prostration* was stated to be present, or this is readily gathered from the history, in but 18 cases. There is no question, however, that decided weakness and sensation of illness occurred in a decidedly larger number of cases than this.

*Headache* was noted in 14 patients (18.67 per cent.), all of at least two years of age. How frequently it was present before this age cannot be determined.

*Loss of appetite* was reported in 25 cases (33.33 per cent.); by which was probably meant a very decided impairment of appetite. Doubtless it existed in others in a less marked degree.

*Cough* was not frequent during the onset, but 18 cases (24 per cent.) having it reported.

*Epistaxis* is noteworthy by its infrequency, it having been seen but four times (5.33 per cent.) during the onset. This is in marked contrast to the condition in adults.

*Distended or tympanitic abdomen* was also infrequently mentioned; only 5 cases in all. Probably others were overlooked, or no statement made; but it clearly is not a common prodromal symptom.

*Abdominal Pain or Tenderness.*—Reference was made to this in but 12 cases (16 per cent.), all among the older infants. Like headache, it may have been existent more frequently; but it was certainly not a common symptom, since *fretfulness* is reported in but 11 (14.67 per cent.). Had pain in any portion of the body been a prominent early symptom there would certainly have been more crying recorded.

*Unusual drowsiness* was mentioned 9 times (12 per cent.), in 2 instances the children, of seventeen and eighteen months, sleeping nearly all the time.



*Convulsions* were reported in but 3 cases (4 per cent.); 1 on the first and second days, 1 on the second, and 1 having convulsions several times during the onset. It is a striking fact that this symptom is so unusual during the onset of typhoid fever in infancy—in sharp contrast to the condition seen in pneumonia, scarlet fever and some other acute diseases.

Apart from convulsions, *unusual nervousness* was reported in only 4 instances; *unusual restlessness* 3 times, and *screaming* in 2 cases. These last 2 showed *rigidity* as well, and the onset was distinctly that of meningitis. In 1 other case there was *early delirium*. Among the other less common symptoms recorded may be mentioned *sore throat*, 1 case; *nausea*, 2 cases; *decided thirst*, 1 case; *pain in the back*, 2 cases; *unusual apathy* or *stupor*, 3 cases.

GENERAL CONCLUSIONS REGARDING THE ONSET.—The onset of typhoid fever in infancy is of decidedly shorter duration than later, its length averaging perhaps three to four days before evidence of the fully developed attack is present. The attack usually comes on rapidly and is often sudden, only about one-third of the cases showing a slower appearance of symptoms. These symptoms consist chiefly of fever, diarrhea, vomiting, prostration, headache, loss of appetite; less often of cough, fretfulness and abdominal pain. The temperature rises rapidly, diarrhea is more common than in childhood, vomiting is a symptom decidedly more frequently seen than later, and loss of appetite is often observed. Prostration is seldom marked. Cough, abdominal pain and distention are comparatively infrequent, and epistaxis is rare.

SYMPTOMS OF THE DEVELOPED ATTACK.—These may be said to date certainly from the time the roseola appears, or, in any event, from the time the fever has reached its height and the disease is thoroughly under way. Apart from the nature of the onset already described, the general course of the disease in infancy, although subject to great variation, would appear on the whole to have definite characteristics. General conclusions can best be drawn after giving a more detailed description of the symptoms seen in the 75 cases under consideration.

*Digestive Symptoms.*—*Coated tongue* was recorded in 35 cases (46.67 per cent.) and was probably present, but not mentioned, in many others. In only 1 is the tongue described as dry and fissured. The lack of tendency to the appearance of the



tongue characteristic of the typhoid state as seen in adults is, therefore, very marked in infancy, so far as this series indicates.

*Sore throat* was reported in 11 cases, shown by redness of the pharynx or tonsils. In the majority there is no record regarding the symptom and conclusions are impossible.

*Loss of Appetite.*—It is noticeable how seldom this was observed in my series—only 5 cases (6.67 per cent.). Although probably present in others, but not recorded, it is clear that decided loss of appetite must have been uncommon. This depends, perhaps, to a considerable extent on the fact that at this age a lesser degree of discrimination as to taste, or of less determination regarding it, made the patients quite willing to take milk in order to allay the thirst which was often present.

*Vomiting* was a not infrequent symptom. I find it mentioned in 27 instances of the 75 (36 per cent.). In at least 8 of these, however, it happened only once or twice after the onset, and in a number of others was insignificant and no more than children of this age, with any illness, are liable to exhibit. In no case was it a threatening symptom, and on the whole it is to be regarded as not one of either great frequency or severity.

*Diarrhea.*—As would appear from this series, this is much more frequent in infancy than in either early or later childhood. I find it recorded in 58 of the 75 (77.33 per cent.). These figures may be misleading to a certain extent, because, at this age, and in the first year especially, the bowels are naturally softer and more frequently moved than later, and a very slight increase of this condition might be called diarrhea and yet not really be this. A study of the case-reports, however, in which the character as well as the frequency of the stools is described, shows that this doubt can attach to but few of the cases. In not many was the diarrhea severe enough to be a matter of importance; but it is certainly to be regarded as a common symptom. In 15 cases (20 per cent.) there was no diarrhea, and in 3 of these the bowels were constipated. In 2 instances no record has been made.

*Abdominal Distention.*—Under this heading, or that of tympanites, is the record of 43 cases (57.33 per cent.). The observation is misleading to a certain degree, some infants having probably a distention from rachitis, or other previously debilitating cause. On the other hand, there has probably often been the failure to record the presence of moderate distention. It remains evident that abdominal distention is a symptom fre-

quent in infancy—more so in my experience than in children after this period; yet when present it was only exceptionally a symptom causing distress or requiring treatment. In only 4 cases is it distinctly stated that the abdomen was not distended. In the remaining no note was made, and no conclusion is possible.

*Respiratory Symptoms.*—*Bronchitis* was so frequently present that I have put it among symptoms rather than complications. Râles in the lungs were recorded in 29 cases, although often only few and scattered. Cough was mentioned in 14 and undoubtedly was present slightly, but overlooked or ignored, in more, as the disproportion between cough and râles is evident. In some of the cases of cough no râles were recorded, and in others the lungs were reported as negative. In at least 37 cases (49.33 per cent.) there were observed either râles or cough, or both. In 20 (26.67 per cent.) there were no evidences of bronchitis noted. In the remaining no record at all was made. We are certainly justified in concluding that tracheobronchitis is a symptom quite common in infancy, but that it is rarely one of importance.

*Rhinitis* was mentioned in but 1 case.

*Epistaxis* after the period of onset was recorded in 3 instances only (4 per cent.). This is in decided contrast to the frequency of epistaxis in adult life; or even to that of later periods of childhood, where it is generally, in my experience, less often seen than in adults.

*Rapid or labored respiration* was reported in 5 cases, dependent in 4 upon prostration and in 1 upon bronchitis.

*Heart and Pulse.*—There is little to be said in this connection. A feeble or rapid pulse is distinctly spoken of in 14 instances, but was undoubtedly present in a decidedly larger number. A rapid pulse-rate attending high fever is, however, of frequent occurrence in infants, no matter what the disease, and it was only in those of the series who were severely or fatally ill that the symptom became one of importance. Treatment for circulatory disturbances was rarely required. A pulse-rate of 130 to 160, with a temperature of 103° to 104° F., was a common figure in cases of moderate severity.

*Nervous Symptoms.*—With the exception of more or less prostration, nervous symptoms were, as a rule, little marked in the cases of this series. There was little of the evidence of the typhoid state so common in adult years, and even the apathy

characteristic of early and later childhood was not a prominent feature. Oftener, perhaps, there was decided restlessness, irritability and fretfulness, and in a few cases the signs of nervous excitement were still more marked, as represented by convulsions, rigidity and the like. More in detail, the symptoms seen were as follows:—

*Prostration* was reported as evident in 21 cases (28 per cent.), generally very decided; and was present without doubt to a certain extent in many more. The mildest cases, however, showed little of it and the children remained in good general condition. Its degree appeared to be proportionate to the general severity of the attack.

A condition of *dullness, apathy, or listlessness* was recorded in but 7 instances; *unusual drowsiness* in 1; a *stuporous condition* in 4; *unconsciousness* in 1, and "*mind not clear*" in 2. This bears out the belief I have previously expressed, that the ordinary adult nervous symptoms are almost always wanting. Only in 1 case was there a condition closely resembling the adult type in this respect.

On the other hand, evidence of *nervous excitation* was present perhaps oftener than at later periods in early life. This was shown by *increased restlessness, nervousness* and, especially, *irritability* and *fretfulness*, and was present in at least 27 cases (36 per cent.), and probably in others in which no direct reference was made to it. In a few the nervous manifestations of this class were still more marked, at least at some time during the fully developed attack. The records showed *convulsions* at this time in 5 instances; *rigidity* of the neck or limbs in 3; and cerebral *tâche* in 2. In 3 cases symptoms distinctly suggesting meningitis were present. The severity of the nervous symptoms appeared to exhibit little, if any, relationship to the height of the temperature. This is not in accord with the views expressed by some writers. Very few references to *pain* are made, and, as far as could be determined, the attack was in most cases not of a painful nature, as is true of typhoid fever at any age. In 1 instance there was pain on moving the neck.

On the whole, it may be said of nervous symptoms at this early period of life that they show themselves oftener through evidences of excitement than of depression, and, although probably more frequent than in early or later childhood, are not a very prominent feature.



*Temperature.*—It is almost impossible in a series of cases as large as this, with a symptom so variable as temperature, to formulate any specific classification. As already pointed out, the temperature during the onset rises rapidly and reaches its maximum probably by the third to the fifth day in most instances. It then continues *high*, from 103° to 105° F., being little influenced by bathing, for a variable time in the average case; perhaps a week or a little longer. In other cases the temperature is *moderately* but steadily elevated at from 101° to 103° F. during the early period. In both these groups one of two changes very commonly occurs; either, first, there is a diminution in the average height of the temperature, which, however, still runs *steadily* with daily variations of from 1 to 1½ degrees; or, second, the temperature becomes decidedly *irregular*, with greater falls after bathing, or occurring independently of this, and without any discoverable cause of irregularity or fixed relationship to the time of day. In still another large class of cases the temperature is more or less *irregular* and *uncharacteristic* during all the period of observation, and either, in general, moderate or averaging high.

The *method of fall* varies greatly. Sometimes there is a rapid fall; sometimes a gradual descent of the curve as a whole to normal; sometimes at first a gradual fall ending in a much more rapid one, with no marked remissions. In other cases decided remissions are present. These generally do not exhibit morning fall and evening rise, as in the adult picture, but occur more irregularly. It is very exceptional, indeed, to see a curve of the adult type.

The *duration of the fall*, too, is very different from that observed in adults. Frequently three or four days from the time a decided tendency to a lesser elevation first shows itself will find the temperature normal. In others six or seven days are required. Not infrequently the fall of temperature is almost critical, occupying one, or sometimes two, days. Slight recrudescences occur readily, but on the whole not frequently. Only occasionally one sees a long persistence of irregular, slight fever, very similar to the condition at times observed in later periods of childhood and in adult life.

The following synopsis gives a more detailed statement of the course of the fever and its duration in the cases analyzed.



In 6 cases a record of the temperature was lacking. The remaining 69 may be classified as follows:—

*Course of the Temperature.*—Temperature steadily high ( $103^{\circ}$  to  $105^{\circ}$  F.), with little daily variation, sometimes followed by irregularity later—31 cases (44.93 per cent.).

Temperature moderate ( $101^{\circ}$  to  $103^{\circ}$  F.), steady, with little variation, at least early—11 cases (15.94 per cent.).

Temperature of an irregular type throughout, with an average either high or moderate—27 cases (39.13 per cent.).

The *character and duration of the fall* was studied in 48 cases. In the remaining various circumstances interfered with this. These 48 cases may be classified as follows:—

Fall gradual, 17 cases (35.42 per cent.).

Fall more rapid, 31 cases (64.58 per cent.).

In these more rapid cases the fall lasted one day (critical), 8 cases; two days, 7 cases; three days, 8 cases; four days, 8 cases.

In 2 of the cases with gradual fall the curve was of the remittent type characteristic of the third stage seen in adults.

*Total Duration of the Fever.*—The following synopsis gives in condensed form the duration of the attack, as evidenced by the duration of fever. As in nearly all series of cases of typhoid fever at any age, there is often lacking here an absolute accuracy. This is due to the impossibility in some cases of determining the exact date of onset. On the whole, however, the figures may be considered fully as accurate as those obtained from series of patients of older age.

(1) Duration undetermined on account of the occurrence of early death in the course of the fever, complications prolonging it, etc.—27 cases.

(2) Duration of the attack determined in 48 cases as follows: Seven days, 1 case; eight days, 1 case; ten days, 2 cases; eleven days, 2 cases; twelve days, 3 cases; thirteen days, 5 cases; fourteen days, 3 cases; fifteen days, 5 cases; sixteen days, 4 cases; seventeen days, 3 cases; eighteen days, 1 case; nineteen days, 4 cases; twenty days, 2 cases; twenty-one days, 3 cases; twenty-two days, 4 cases; twenty-five days, 2 cases; twenty-six days, 1 case; twenty-seven days, 1 case; thirty-two days, 1 case. It will be seen, then, that the duration of the fever in these 48 cases was over three weeks in 9 instances (18.75 per cent.), and of three weeks or less in 39 instances (81.25 per cent.), 17 of these (35.42 per cent.) lasting but two weeks or less. In

one of the cases classified as undetermined, the fever continued for thirty-six days, and in another for fifty-seven days. Whether this depended upon undiscovered complications or upon persistence from other cause could not be accurately decided.

*Cutaneous Symptoms.—Typhoid Roseola.*—This was recorded in 48 of the 75 cases (64 per cent.), and it is practically certain that repeated systematic search would have shown it present in more. Sometimes the spots were very numerous, widespread, and appeared in crops; in others they were but few in number. There seems to be no difference from later life in this respect. The exact *time of the appearance* could be determined in a few cases only. In 1 instance the spots developed on the fourth day, the onset here being sudden and its date clearly known. In 5 cases the date of appearance could be fixed at the sixth day, and in 8 other cases, first examined on the sixth day, the rash was already present. In 4 cases first examined on the seventh day, the rash was already out, and in 1 other it could be fixed at the seventh day. In 2 cases the date was certainly the eighth day, and in 7 first examined on this day the rash was already developed. How much earlier it had appeared could not, of course, be determined. In 4 cases the rash was first discovered on the ninth and in 2 on the tenth day. In the remaining cases, for the most part, the rash was found when the child was first seen at later periods in the disease.

We may conclude, then, that in the first two and one-half years of life, as shown by this series, there is a decided tendency for the rash to develop much earlier than in adult life, somewhere from the fourth to the sixth or seventh day, there having been at least 14 cases, *i.e.*, 18.67 per cent. of the total number, or 29.17 per cent. of the 48 cases, in which it developed on or before the sixth day. The early appearance of the rash probably corresponds to a certain extent with the shorter duration of the onset characteristic of so many cases at this time of life. There are, however, exceptions, and the rash may first appear on the eighth or ninth day and even later. Probably, in most of the cases in which the rash seemed to have been later in developing, the spots were few in number and the earlier ones were overlooked.

Of other cutaneous manifestations *herpes* was observed in 2 instances and *petechiæ* in 2.

*Splenic Enlargement.*—The determination of this symptom is

always more or less unsatisfactory in infancy, owing to the common abdominal distention and to the voluntary resistance offered. More frequent examination would surely have revealed enlargement in more cases. As it was, I find the record of enlargement of the spleen in 40 cases (53.33 per cent.). In 4 of these this was determined only by percussion and in 1 only at autopsy; but in all, or nearly all, the others by palpation, since this was the only method of physical examination relied upon. Data regarding the time of the discovery of the enlargement were collected, but are not sufficiently detailed to be of value. It may be said that, as a rule, the splenic enlargement was observed at the same time as the roseola, or a little later. In 26 cases it is stated that no enlargement was found, and in 9 no record at all was made.

*Blood.—Widal Serum Reaction.*—A few of the earlier cases antedated the time when the employment of the Widal agglutinative reaction became common. A test was made in all but 9 instances. Of the remaining 66 cases, 62 gave a positive reaction and only 4 a negative one. The 4 negative cases exhibited typical symptoms in other respects. We have, therefore, 82.67 per cent. of the 75 cases giving a positive Widal reaction, or 93.94 per cent. of the 66 cases examined.

*Leukocytosis.*—In 43 of the children a leukocyte count was made. The result sustained the diagnosis in nearly all instances. A detailed account would occupy too much space. Grouping them, there were 4,000 to 5,000 per cmm., 2 cases; 5,000 to 6,000, 4 cases; 6,000 to 7,000, 3 cases; 7,000 to 8,000, 5 cases; 8,000 to 9,000, 11 cases; 9,000 to 10,000, 4 cases; 10,000 to 11,000, 5 cases; 11,000 to 12,000, 2 cases; 12,000 to 13,000, 1 case; 14,000 to 15,000, 3 cases; 16,000 to 17,000, 1 case; 18,000 to 19,000, 1 case; 20,000 to 21,000, 1 case. In 36 of the cases the number of leukocytes did not exceed 12,000, and in only 7 was it over this figure. In one of these pneumonia was present as a complication, and in another pyelocystitis; in the others no complication could be discovered.

*Urine.*—Examinations are recorded in 38 cases only. Of these, 12 showed albuminuria and 26 none. In 6 of the 12 there was also the presence of hyalin and granular casts. In 4 of the 6 they were but few in number, but in the remaining 2 more numerous. In 1 case albuminuria depended upon pyelocystitis. As so many of these cases of typhoid fever in infancy are of



the severe type, albuminuria might reasonably have been expected to be more frequent than it was.

GENERAL CONCLUSIONS REGARDING THE SYMPTOMS OF THE ATTACK.—The fully developed attack of typhoid fever in infancy shows many *digestive symptoms*. Coating of the tongue is of common occurrence; dryness and fissuring are exceptionally rare. Redness and swelling of the throat would probably be found frequent if examinations were systematically made. Decided loss of appetite is uncommon; vomiting is comparatively frequent, although often only occasional and seldom severe. Diarrhea is certainly much more common than in early childhood, being seen in decidedly the majority of cases, but is seldom severe enough to demand specific treatment. Abdominal distention is frequent; probably more so than at later periods of childhood, but is seldom distressing.

*Of respiratory symptoms* bronchitis is common, but seldom a matter of importance, and epistaxis is rare. The *heart and pulse* are seldom much involved and only in the severest cases, a rapid pulse-rate being the natural phenomenon in typhoid fever at this time of life. *Nervous symptoms* are, on the whole, not marked, those of depression being decidedly less frequent than those of excitation. The typhoid state of the adult is very exceptional. Prostration is not often great, but moderate irritability and fretfulness are frequently seen. Only occasionally does the disease simulate a meningitis.

The course of the *temperature* is uncharacteristic; a temperature steadily high or moderate, and later often irregular, being of frequent occurrence, and almost as frequent is one which is irregular from the beginning. Not only is the initial rise of temperature rapid, but the fall is so also in many cases, an almost critical fall being sometimes seen, and still oftener one which requires only three or four days for normal to be attained from the time the first decrease of fever shows itself. The morning fall and evening rise of the third period of the adult is very exceptional in infants. The total duration of the fever is three weeks or less in the great majority, and in at least one-third of the cases only two weeks or less.

The typhoid *roseola* is probably as common as in adults, but appears earlier, oftenest from the fourth to the sixth day. *Splenic enlargement* is found in at least one-half the cases. The *Widal reaction* is as characteristic as in adult life and leukocytosis is



usually absent, in spite of the fact that in infancy many outside causes readily disturb the leukocyte count. The *urine* often shows albuminuria, with casts in a considerable number of cases.

COMPLICATIONS.—These are of various sorts and encountered not infrequently, 31 patients (41.33 per cent.) showing complications of some kind. They may be enumerated as follows: Diphtheria, 9 instances; measles, 3; pneumonia, 7; pertussis 1; jaundice, 1; intestinal hemorrhage, 1; conjunctivitis, 1; aphthous stomatitis, 1; ulcerous stomatitis, 2; necrosis of the jaw following ulcerous stomatitis, 1; parotitis, 2; (1 suppurative); purulent otitis, 8; pyelocystitis, 1; furunculosis, 5; abscesses, viz., ischio-rectal, 2; submaxillary (glands?), 2; buttock, 1; sacral region, 1; scapular region, 1; fingers, 1; abdominal walls, 1. There will be noticed here especially the tendency to suppurative processes, evidenced in 19 of the 75 patients (25.33 per cent.). Nephritis has been mentioned earlier under symptomatology.

RELAPSE.—This occurred in 3 instances, with a possible 4th. In the latter, development of measles prevented the accurate determination of the question. In the other 3 the intervals between the first and second attacks were respectively fourteen, fifteen and five days. In the last case some uncertainty existed on this point, as the presence of suppurative processes about the end of the first attack may have prolonged this unduly.

DIAGNOSIS.—This must be considered carefully, since the disposition has often been shown on the part of many physicians to question its correctness in cases supposed to be typhoid fever at this time of life. There were a number of cases entered upon the records of the Children's Hospital as typhoid fever which I have rejected as not conclusive. Of the 75 reported, 62 cases, as already stated, gave a positive Widal serum-reaction. In at least 48 instances the typhoid roseola was present. In a considerable number, also, as already detailed, there was enlargement of the spleen, a very decided history of others in the family suffering from typhoid fever or an absence of leukocytosis. Taking a positive Widal reaction as a proof of the existence of typhoid fever, we have only 13 cases of the 75 not showing this. Of these 13 only 4 gave a negative reaction, and later examinations would probably have given a positive result. In the other 9 a test was not made. In all but 3 of the 12 the diagnosis was confirmed by the presence of the typhoid roseola, often with

splenic enlargement. In 2 of the exceptions, in which neither roseola nor positive Widal reaction was recorded, there were, in addition to other suggestive symptoms, the presence of typhoid fever in other members of the family, and in 1 of these the postmortem lesions characteristic of the disease.

Lest any question be raised about the reliability of the Widal reaction in these cases as a diagnostic sign, I may add that in nearly all cases giving the reaction other very positive confirmatory signs were present. In all but 23 of these the typhoid roseola was present also. In 11 of these 23 the diagnosis was confirmed by the leukocytic count; in 1 by autopsy; in 1 by the family history; in 1 by the occurrence of well-marked relapse; and in 1 by enlargement of the spleen. This leaves but 8 cases, and in 3 of these the obtaining of 2 positive Widal reactions seems sufficient proof. No account is being made in this connection of the symptom-complex in other respects, although this naturally must have weight.

Probably in any group of cases of whatever age some errors in diagnosis will occur, but the present series can, I think, be rightly questioned no more than a series in older patients; indeed, probably with less reason on account of the special care which has been taken to avoid the occurrence of error as far as possible.

*Postmortem Lesions*.—Only 3 autopsies were obtained—in children of three months, five months and twenty-seven months respectively. The appearances were similar in all. There were found enlarged spleen and mesenteric glands, with swollen Peyer's patches and solitary follicles. In 2 instances there was very superficial ulceration, and none at all in the other. This confirms the prevailing views regarding the anatomic lesions of typhoid fever in infancy.

*PROGNOSIS*.—With regard to the *severity in general* of typhoid fever in infancy, the records show 8 very mild; 11 which may be called mild; 23 moderately ill, perhaps as much so as the average case in childhood; 33 which must be called rather severe. These estimations are, for the most part, based upon the written case-histories, from which the forming of a conclusion is difficult. Still, it is evident that the disease was of a rather severe type in the cases reported.

This is borne out, too, by the mortality figures, since 12 of the patients died; a mortality of 16 per cent. The ages of these

12 patients were respectively three, five, seven, fourteen, fifteen, eighteen, nineteen, twenty-one, twenty-seven, twenty-eight months, each 1 case; and thirty months, 2 cases. One of these patients should fairly be excluded from the list, as death resulted from pneumonia with measles, which appeared after two weeks of apyrexia. Two others developed diphtheria just as the course of the typhoid seemed to be closing; yet there is no good reason to exclude them, since the attack of typhoid fever undoubtedly rendered death from diphtheria much more likely to occur. However, even omitting all 3, there remains a mortality of 12 per cent., a figure decidedly higher than I have found in early childhood, the most favorable age, and fully equal to, if not greater than, that which we may reasonably look for in later childhood. The cause of death in the 12 cases depended, in part at least, on complications, these being pneumonia in 2 cases and diphtheria in 3. In 7 cases no complicating condition could be discovered, except 1 instance, where numerous furuncles perhaps added to the great prostration upon which death followed. In the others death appeared to be a direct result of the disease itself.

TREATMENT.—Little discussion of this topic is required. The treatment employed was in every instance symptomatic. The use of hydrotherapeutic measures was systematically followed. Tubing was usually preferred to sponging, as it was both more effective and less trying to the patient. Occasionally packing answered well. Cold baths were never given, the water used being of a temperature of 90° to 100° F. Diarrhea sometimes needed treatment, and cardiac stimulation was required in the severer cases. The diet, as a rule, was largely of milk, as being best suited for patients of this early age. Often cereal gruels were also administered when milk was deemed insufficient, and sometimes broth, beef juice and albumen water. In no instance was there evidence of any deleterious symptoms following a milk diet, as some writers have claimed is likely to occur. Indeed, in some cases where no milk had been given for a time, improvement occurred when a milk diet was resumed, while in others unfavorable symptoms did not disappear after milk had been stopped. There seemed, in fact, to be no relationship between typhoidal toxemia and the diet.



## VACCINES IN THE TREATMENT OF PERTUSSIS.

BY MAYNARD LADD, M.D.,

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In 1905, Bordet, working in collaboration with Gengou, discovered an organism which he considered the cause of pertussis. It is a small coccobacillus resembling the bacillus of influenza in size and shape. It is usually found in the viscid exudate expectorated from the bronchi during paroxysms of coughing. The organisms may be stained with weak solutions of fuchsin and does not take the Gram stain. It grows best on a medium made of equal parts of defibrinated blood (human or rabbit) and 3 per cent. agar, containing small quantity of potato extract and glycerin. It also grows fairly well on serum bouillon or blood bouillon, but on ordinary culture media only after it has been cultivated in the laboratory for some time.

While not universally recognized, the identity of Bordet's bacillus as a causative factor of whooping-cough is fairly well established. The strongest evidence of this perhaps is the agglutination and complement fixation reactions first observed by Bordet and afterward confirmed by numerous investigators. Further evidence is afforded by an experiment of Bordet with vaccines prepared from this organism. Twenty children who had been exposed to whooping-cough were given injections and in every case developed unusually violent cases, clearly indicating that a profound negative phase had been produced. Experiments on lower animals to determine the pathogenesis of this organism have been unsatisfactory. Ordinary laboratory animals are not infected by inoculations, but Klimenco and Fraenkel claim to have produced typical whooping-cough in monkeys by injections of this organism. Klimenco also believes that similar results were produced in puppies, but this latter work has been greatly questioned.

Although inoculations with small quantities of this organism into animals are not followed by the development of an infective process, larger doses kill animals with symptoms of profound toxemia, evidently due to toxins generated during growth on media. Toxins extracted from cultures of this organism injected into the peritoneum of a guinea pig produce hemorrhagic



and exudative lesions. Injected subcutaneously they result in edema and necrosis. Inoculated into the eye of a rabbit they produce necrosis of the cornea. Bordet calls attention to the fact that an analogous necrosing influence may be observed on the surface of bronchi of affected children and believes that the manifestations of this disease are due to lesions of the cellular lining of the bronchi, resulting from the action of this irritant poison.

In the preparation of the vaccine used in this series the organisms are grown on blood agar in the incubator for twenty-four hours. The growth is then washed off with sterile physiologic salt solution and a bacterial count is made to determine the number of organisms per cubic centimeter. In conducting this bacterial count the blood cell method of Wright is used. This consists of taking drops of equal size of the blood of a normal individual, and of the emulsion under examination. This mixture is then examined under the microscope in exactly the same manner employed in conducting a blood count, and by estimating the number of bacteria present in proportion to the number of red blood cells and having determined erythrocyte count of the patient, by a previous examination of the blood, one can accurately compute the number of bacteria present per cubic centimeter. After having made a count the organisms are killed by heating in a water bath at a temperature of 60°C. for one hour, and the emulsion is diluted with physiologic salt solution to the desired bacterial content per c.c. Bacterial tests are then conducted, plants being made upon the various culture media under both aerobic and anaerobic conditions. Safety tests are also made by injecting the vaccine subcutaneously into guinea pigs.

The cases selected in this series were clinically typical cases of pertussis, as the disease occurs in infants and young children. In every instance a characteristic paroxysm occurred in the clinic. The blood counts showing the relative increase in mononuclear cells made the clinical diagnosis reasonably certain.

We were inexperienced in the effects of the vaccines and therefore had to exercise caution in the size of the injections and the intervals between injections. The administration was further complicated by the irregularity with which the vaccine was supplied. A minimum interval of five days was allowed to elapse between injections. Sometimes, owing to shortage of material or negligence on the part of the mothers in bringing their chil-

dren to report, the interval was increased to ten days or two weeks, or even longer.

It was soon evident that no harmful effects were produced. There were no general constitutional symptoms nor local reaction at the site of the injections. In the early cases it was soon found to be safe to give 20,000,000 (1 c.c.) at each treatment, even to an infant. Later as much as 40,000,000 (2 c.c.) were injected at one time with no ill effects. One infant of seven weeks received, on May 18th, 5,000,000; on June 9th, 12,000,000; on June 14, 10,000,000. This was the youngest child treated—(No. 9). It recovered so quickly in three and one-half weeks that one is in doubt as to whether it was a genuine case of pertussis. The blood was not examined in this instance. Injections of 40,000,000 were given four times to babies nine months of age. In another series of cases we should be inclined to start with this dose and repeat at intervals of five days and perhaps oftener. Considerably larger doses could probably be given in the course of this disease, possibly with more marked effects.

No other treatment was given than the vaccine. In general, it appeared, so far as one could judge from the statements of the mothers, that after three injections the severity and number of paroxysms diminished. All of the children recovered without complications on an average in five weeks after beginning treatment. On an average the cases were in the third week of the disease when the vaccines were started. There is nothing brilliant or conclusive in these results, but when one has experienced in such a clinic as that at the Infants' Hospital, the long drawn-out cases lasting for two and three months, one cannot help feeling that the vaccine had in this series some favorable effect and at least is worthy of further trial.

*Examination of the Blood.*—The white blood count was made in 9 cases with results as follows:—

	White Count.			Polynuclears.	Mononuclears.	Mast-cells.	Eosinophiles.
1.	31,600	9	mos.	47	53	0	0
2.	35,000	2½	yrs.	40	55	2	3
3.	14,600	6	"	55	45	0	0
4.	7,000	2	"	34	65	1	0
5.	15,000	3½	"	40	60	0	0
6.	17,200	5	"	41	58	0	1
7.	41,200	9	mos.	16	83.5	0	0.5
8.	15,000	9	"	34	64	0	2

These observations are in accord with the generally accepted view that there is a moderate to pronounced leukocytosis in the early stages of pertussis, the differential count showing an in-

crease in the mononuclear cells. The only apparent exception in this series is in No. 3. This child was, however, six years old. A count of 45 per cent. mononuclear is about 7 per cent. in excess of the average normal at this age. The only child showing no leukocytosis (No. 4) was one of the family of four, all of whom had unquestional clinical symptoms of pertussis.

*Results of Treatment.*—

	Name.	Age.	Duration before Treatment.	Duration of Cough after Treatment.	Number of Injections.	Total Number of Vaccines.
1.	R. K.	9 mos.	8 weeks	8 weeks	6	150,000,000
2.	M. S.	9 "	3 "	6 "	8	170,000,000
3.	M. C.	6 yrs.	2 "	4 "	4	120,000,000
4.	E. C.	2 "	3 "	3 "	3	100,000,000
5.	A. C.	3½ "	3 "	3 "	3	100,000,000
6.	M. C.	5 "	1 "	4 "	4	100,000,000
7.	M. M.	2½ "	3 "	5 "	6	120,000,000
8.	M. M.	16 mos.	?	?	2	80,000,000
9.	R. D.	7 wks.		3½ "	3	37,000,000

The record of No. 8 was unavoidably incomplete. The child, sixteen months old, received two injections of 40,000,000, each on May 22d and June 12th. The mother then reported the baby better and did not return until August 3d, and then for another trouble. It is uncertain how long the cough lasted.

Six additional cases received the vaccines. Five of these failed to report at the clinic after the first injection, until so long after the initial treatment, that no further observations were made. In four of these infants the initial dose was 20,000,000; in a fifth, a baby of nineteen months, 40,000,000.

*Conclusion.*—It is obviously impossible to draw any conclusions as to the efficiency of the pertussis vaccine from so few cases. They are reported now in the belief that the treatment is worthy of further trial, using larger doses and at more frequent intervals than in this series, and to be judged in connection with the results obtained in future clinical observations.

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# A CASE OF MASTOIDITIS FOLLOWED BY GENERAL SEPSIS, WITH SYMPTOMS OF TETANUS.\*

BY MATTHIAS NICOLL, JR., M.D.,

AND

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New York.

The following case, illustrating extreme difficulty in diagnosis even with every facility for careful study, seems worthy of report.

The patient was sent to Bellevue Hospital and admitted to the service of Dr. La Fétra on January 6, 1911, by a diagnostician from the Department of Health, to whom her physician had reported it as a case of tetanus and probably due to vaccination two weeks previously. As the vaccine used was that sent out by the Department laboratory the case was turned over to us for advice and treatment.

Olympia V., age four years, born in the United States of Italian parents.

*Family History.*—No bearing on the case.

*Past History.*—Patient is the second of three children and has always been well. Full term child, normal delivery, breast-fed for one year.

*Present Illness.*—Vaccinated two weeks ago. Two days ago she became drowsy, unable to open mouth or take solid food. Yesterday began to have convulsions and has them at irregular but frequent intervals.

**PHYSICAL EXAMINATION.**—General appearance well developed and well-nourished child. Unconscious, cyanotic, lies flat on back, occasionally moaning.

*Eyes.*—Pupils equal, react to light. Lids kept half shut. Tendency to keep eyes turned to the left. No paralyses.

*Head* well formed, no sign of traumatism. Jaws set tight. On attempting to open them a clonus is set up.

*Lungs* resonant throughout, occasional scattered, sticky râles. Respiration markedly irregular, occasionally sighing. The rate not increased, no dyspnea.

*Heart.*—Sounds normal, not enlarged, force good.

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\* From the Research Laboratory, Department of Health.



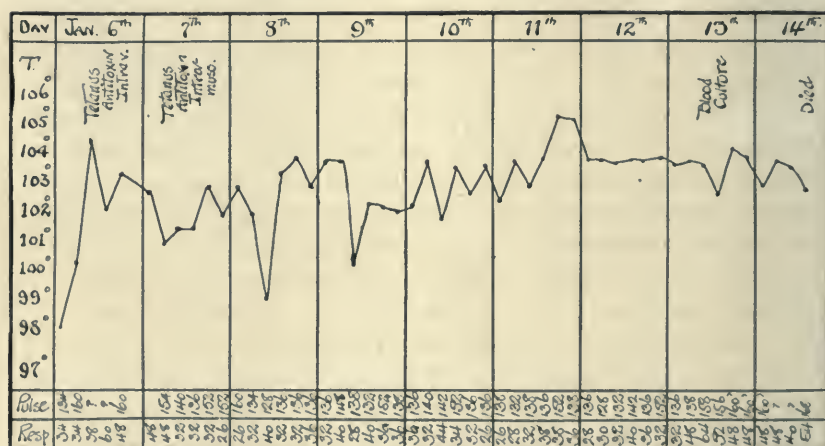
*Abdomen.*—Soft and natural, no masses, no tenderness.

*Liver and spleen* not palpable.

*Extremities.*—Well formed, reflexes over-acting. Ankle and patellar clonus easily obtained. Hands, fingers and wrists in position of tetany. No Babinsky, no Kernig, moderate rigidity.

*Muscles.*—Fibrillary contraction of platysmae.

*Skin.*—On right upper arm there is a hyperemic area slightly indurated, about the size of a silver dollar, in the center of which there is a crust about the size of a 5-cent piece. Scattered about the crust are a few small vesicles. The lesion has



Temperature chart of case reported.

the appearance of a perfectly normal vaccination in the drying stage.

*Pulse.*—Moderate rate, high tension and regular.

During the forenoon of January 6th, 17,000 units of tetanus antitoxin were given intravenously. The material from the vaccination was removed to the laboratory for study. The stock of vaccine with which the child had been vaccinated was resubmitted to a test for tetanus similar to that employed on each specimen of virus before its issue. The result was negative by culture and animal inoculation in both instances.

During the day of January 6th, and the following night and day, the child continued in the condition in which she was received into the hospital—unconscious, temperature 101° to 103° F., heart action rapid and feeble, trismus marked, slight left

strabismus in both eyes. Hand and arms in condition of tetany, more marked on the right side. No rigidity of neck, back muscles or lower extremities. Occasional convulsive movements of the face and upper extremities, but no general convulsions. The child was being fed through the nose.

Lumbar puncture was performed and about 30 c.c. of clear fluid under moderate pressure were obtained. Examination showed fifteen cells to a cubic millimeter, globulin test negative. Fehling's solution reduced. No meningococci or tubercle bacilli. Blood pressure: systolic, 60; diastolic, 38.

January 8th, 9,000 units of tetanus antitoxin given intramuscularly. Today the second lumbar puncture gave about 20 c.c. of clear fluid. The first part of the flow was slightly blood-tinged. Results of examination practically as before. Von Pirquet test negative. The rigidity has diminished. Less spasm of jaws, no clonus obtained on attempting to open them. No ankle or patellar clonus obtained to-day. No fibrillation of platysmae. The child remained unconscious. Babinsky sign obtained on the left side. Has vomited several times today. The bowels are loose and move frequently. Several convulsions of a mild grade.

During the night the child had occasional muscular twitchings of face and eyes principally on the right side, and of the right upper extremities. The jaws are still stiff. In the afternoon, an examination of the ears showed some redness and slight bulging of left tympanic membrane. Right drum apparently normal. Paracentesis of left drum by Dr. Hill, house physician, produced free bleeding but no pus. Within twenty-four hours the irrigation fluid returned clear.

On January 10th, the second examination of the ears by the visiting otologist revealed no apparent abnormality. The paracentesis produced no effect on the child's condition.

January 11th, eye examinations by the visiting ophthalmologist showed no abnormality.

During the next three days the patient grew weaker, with diarrhea and occasional vomiting; was still unconscious, but could be aroused to a certain extent. There was alternate pallor and flushing of the face. The trismus persisted but was less marked. Rigidity of the arms and hands less; none of the neck, back or lower extremities.

January 13th: In the morning the left foot and left hand

were observed to be markedly cyanotic. A blood culture taken showed hemolyzing streptococci in abundance.

In the afternoon there were slight twitchings of the right leg and left eye. During the night cyanosis of the nose and temporal regions. Pulse very feeble and rapid. The coma was complete, with occasional moaning.

January 14th, child moribund, radial pulse cannot be counted. Respiration labored.

Death occurred in the afternoon, eleven or twelve days after the onset of first symptoms, eight days after admission to the hospital.

The urine had been passed in sufficient quantities and the examination of it showed nothing abnormal. The autopsy findings were as follows and reported by Dr. Norris, director of the pathological department:—

#### POSTMORTEM RECORD.

DR. CHARLES NORRIS, DIRECTOR, BELLEVUE HOSPITAL.

PATHOLOGIST—DR. GUY WALLACE.

Name, Olympia V., age four years. Died, January 14, 1912.

Date of postmortem, January 15, 1912. Fourteen hours. P.M.

#### *(Abstract of Essential Findings.)*

*Anatomical Diagnosis.*—Double suppurative otitis media and mastoiditis; edema (inflammatory) of scalp; petechiæ of the pleura; commencing hemorrhagic lobular pneumonia; persistent thymus; acute parenchymatous hepatitis and nephritis; moderate pial edema.

Body is that of a well-nourished, large female child. The skin has everywhere a slightly dirty yellowish appearance. Over the right arm there is a vaccination scar; the crust is removed readily. Tissues beneath appear to be normal.

The peritoneal cavity contains no fluid. Both pleural cavities are free from fluid, are very slimy to the touch.

*Lungs.*—The right pleura shows a considerable number of 5 to 6 mm. sized petechiæ. The right apex shows a number of small recent, hemorrhagic areas of lobular pneumonia, the largest being about 5 to 6 mm. in diameter. The left pleura shows a smaller number of petechiæ. The lungs are congested, well aerated, the bronchi are congested without exudate. The bronchial lymph nodes are small.



*Heart.*—Pericardial cavity is free from fluid. There are a few small, whitish opaque spots on the pericardium of the right ventricle. All the valves of the heart are normal. The foramen ovale is closed. The anterior coronary arteries and the aorta are normal.

*Kidneys.*—Both kidneys are somewhat enlarged and pale. The stellate veins are markedly injected. Cortex is thickened and pale. Markings distinct. Pelves and ureters normal. *Urinary Bladder* normal except for a small, elevated, bluish area above the urethral orifice. Genital organs normal.

*Gastrointestinal Tract.*—Esophagus normal. Stomach is somewhat congested. There are a few small petechial hemorrhages in the mucosa. Upper portion of the small intestine is normal. The large intestine is normal. Solitary follicles are not hyperplastic. The mucosa is everywhere smooth.

*Organs of the Throat and Mouth.*—Tonsils are slightly enlarged. The pharynx and larynx are normal. No thrombosis of the jugular or innominate veins.

*Head.*—There is a small, superficial hemorrhagic area over frontal portion of the scalp; there is considerable edema of the scalp posteriorly over both occipital bones and mastoid region. The skull is somewhat firm, brachycephalic in shape. The dura is not adherent. There is moderate pial edema. The vessels at the base are normal. The anterior cisterna contains clear fluid. There are no pial opacities. The lateral ventricles and the ependyma are normal, also the fourth ventricle. Velum interpositum normal. Cross sections of the brain reveal no gross lesions. Cortex is somewhat dark in color. White matter contains an excessive number of blood points. No areas of hemorrhagic encephalitis or softening were discovered. Cross sections of the medulla and pons show no lesions. *Both middle ears and the mastoid cells contain an abundant whitish exudate which on examination show Gram positive diplococci and streptococci apparently in pure culture.* The mastoid bone is everywhere hyperemic.

*Cultures of the spleen show streptococci.*

Longitudinal sinus and lateral sinuses and upper portion of internal jugular veins are free of thrombi.

The very great prominence of the symptom of lock-jaw coming on early in the disease, together with a history of a recent



vaccination, must be our excuse for failing to arrive at the correct diagnosis. The fact, however, that the patient became unconscious at such an early stage led us to doubt the existence of tetanus several days before death, although the true cause of the symptoms was not suspected.

Blood cultures taken at an early period might have led to a correct conclusion and yet there may not have been more than a localized suppurative condition in the mastoid processes until a few days before death.

The case teaches, what is now more generally recognized, that mastoid disease may exist without there being any local evidence of it or even any distinct involvement of the middle ear, and, further, that such a process localized in the mastoid cells with the subsequent occurrence of general sepsis may give rise to a condition of lockjaw, together with additional symptoms not to be distinguished from those ordinarily due to localized lesions in the meninges.

We wish to express our appreciation of Dr. Hill's successful efforts in obtaining permission for a postmortem examination, without which the true nature of the case must have remained more or less conjectural.

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ANTITYPHOID VACCINATION.—F. F. Russell (*Journal of American Medical Association*, May 4, 1912) concludes that: (1) Antityphoid vaccination in healthy persons is a harmless procedure. (2) It confers almost absolute immunity against infection. (3) It is the principal cause of the immunity of the troops against typhoid in the recent Texas maneuvers. (4) The duration of the immunity is not yet determined, but is assuredly two and one-half years, and probably longer. (5) Only in exceptional instances does its administration cause an appreciable degree of personal discomfort. (6) It apparently protects against the chronic bacillus-carrier, and is, at present, the only known means by which a person can be protected against typhoid under all conditions. (7) All persons whose professions or duty involves contact with the sick should be immunized. (8) The general vaccination of an entire community is feasible and can be done without interfering with general sanitary improvements, and should be urged wherever the typhoid rate is high.—*Medical Record.*

## TUBERCULOSIS IN YOUNG CHILDREN.\*

BY A. HYMANSON, M.D.,

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Although tuberculosis was known to physicians in ancient times, and was described with unmistakable clearness by Hippocrates (360 to 377 B.C.), still, tuberculosis in early childhood was never thought of in the older text-books. It was in the first quarter of the nineteenth century that Laenneck claimed an affinity between scrofulous enlargement of the glands and tuberculosis, when the profession began to describe tuberculosis in children. A final step toward the establishment of this disease in all ages has been made by the discovery of tubercle bacilli by Robert Koch.

The frequency of the disease in children is shown by R. Hutchinson.<sup>1</sup> He says, "Judging by statistics taken in various parts of the world, it seems that one-third of the children dying in hospitals die from some form of tuberculosis. Hecker and Trumpp<sup>2</sup> claim that nearly 30 per cent. of all children possess latent tuberculosis. Of all deaths due to tuberculosis, 30 per cent. are in children. Dr. H. Koplik<sup>3</sup> says: "In the first five years of childhood, tuberculosis is found in fully 50 per cent. of autopsies."

As to age, according to Holt,<sup>4</sup> an autopsy was made in 382 cases of tuberculosis. In the first year there were 160 cases; of these, 67 were under six months, 10 of whom were under three months of age.

The diagnosis of tuberculosis in young children by rational symptoms alone is extremely difficult, the onset is insidious, the progress slow, the child is apt to die before the diagnosis is established. Hence, special efforts have been made to discover methods of diagnosing these cases.

Several pathognomonic tests have been resorted to. First, finding tubercle bacilli either in the sputum, feces, urine or cere-

\* Read before the Clinical Society of the Jewish Maternity Hospital of New York, April 24, 1912.

brospinal fluid; second, fever reaction, following the injection of small doses of tuberculin, blood examination, opsonic index and skiagraphy.

The sputum is not so easily obtained from small children. In the microscopic examination of feces or cerebrospinal fluid, a careful search for the bacilli is required, they being very scarce. It sometimes requires one-half hour or more for each examination and often proves a tedious task for the bacteriologist.

The fever reaction following subcutaneous injection of tuberculin has been found quite unreliable. It requires a trained

The fever reaction following subcutaneous injection of tuberculin has been found quite unreliable. It requires a trained nurse at home or hospital care—the child must have normal temperature before trying this test. At times, it has been necessary to make several injections of tuberculin before getting the required result.

Professor Babinski, of Berlin, has never encouraged the use of these injections, he having told me that injections of tuberculin in small children are not without danger, an active tuberculosis has been lighted up from a latent one by the injection of tuberculin. Skiagraphy is undoubtedly a useful method to detect consolidation and enlarged peribronchial glands, but requires a good man to interpret the plate, and is not so easily accessible to the average practitioner.

The opsonic index is quite difficult to carry out and there is always a possibility of some technical error.

The discovery of tubercle bacilli in the blood is a mooted question which the bacteriologist must study.

The blood test, also, is unreliable. The low leukocyte count under 10,000 is said to be in favor of tuberculosis, but is a very poor guide.

Within the last few years four tuberculin tests have been discovered for the use of suspected tuberculosis. These were found very useful, particularly for children. They are the Calmette, or eye-test; the von Pirquet, or skin-test; the Moro, or inunction-test; and the puncture-test (Stich-reaction of Hamburger and Epstein). The three latter tests are truly specific for tuberculosis in children. The ophthalmic test has been discarded, as in a number of cases, the eyes of the child showed permanent injury.

In the Jewish Maternity Hospital, in New York City, during the years of 1909 and 1910, I applied the Moro and von Pirquet

test on 68 infants, two days to two weeks old, the mothers being apparently free from tuberculosis; none of these children showed any trace of reaction.

In another series of 18 cases, I applied both of these tests, not only in the infants, but in the mothers, also. The following results were obtained: Four of the mothers showed positive reaction, three of these showed some physical signs of tuberculosis, and the sputum of one of the mothers was positive.

The infants invariably showed negative reaction. I looked for enlarged glands in the 86 infants, but found none, with the exception of one infant, all its glands being somewhat enlarged. I found no history of syphilis in this case.

The application of the von Pirquet test for very young infants has been made use of by other observers with results similar to mine.

Dr. O. Bondy<sup>5</sup> applied the cutaneous tuberculin reaction in the newborn, in 350 cases between the second and fourth days after delivery. A positive response was obtained in 71 per cent. of the mothers, but in the infants the test always gave negative results.

Drs. Paten and Griemert<sup>6</sup> applied the von Pirquet test in 53 children, less than two weeks old, in 4 less than four weeks old (the mothers being apparently free from tuberculosis), not one of the children showed a trace of reaction.

Schlossmann<sup>7</sup> cites Berend, who inoculated with tuberculin 4 children of tuberculous mothers and many born of healthy mothers, but did not obtain a positive reaction in a single case. Professor Schlossmann himself attempted to diagnose tuberculosis in early infancy, by means of tuberculin, but in more than 200 cases he did not meet with a case of congenital tuberculosis, in spite of the fact that a great many of his cases were children of tuberculous mothers, in whom medical diagnosis had been substantiated by means of the tuberculin test.

Epstein,<sup>8</sup> in 200 infants of tuberculous mothers, did not find tubercle in any of the cases.

Judging from the above, we may come to the following conclusion: Whatever opinion one may have of the question of heredity of tuberculosis, one fact has been proven—that almost all infants, with few exceptions, are born free of tuberculosis but that they contract it during infancy, or childhood, mostly



through faulty hygiene, association with adults who are afflicted with the disease or presumably cured from tuberculosis.

An examination, made by the New York Department of Health in 1908, of a number of children living in families in which there was but one case of tuberculosis, showed that in 51 per cent. of the cases one or more of the children in these families were affected by the disease.

Holt,<sup>9</sup> after a careful investigation in the Babies' Hospital, says a history of such exposure was definitely traced in 54 per cent. of 101 consecutive cases of tuberculosis in young children and there is even a very much larger number in which the connection cannot be traced.

Among those who die of tuberculosis at all ages, the majority have contracted the disease in childhood.<sup>10</sup> Ritter and Vehling took very accurate histories in 206 cases of adult pulmonary tuberculosis and came to the conclusion that in 82 per cent. the infection was probably during childhood.

It is not necessary to look for a tuberculous cow or for a tuberculous ancestry, although the former may do some harm or the latter may cause some predisposition—the best thing is to look for some tuberculous person who was either playing with or kissing the child. I shall cite a few authentic cases to show how wrongly this problem is being handled by our rich hospitals and charitable organizations.

Girl, M., was treated at Mt. Sinai Hospital for tuberculous peritonitis. Her condition became worse and she was then sent home where she died eight weeks later.

Her brother, eighteen months old, contracted the disease from her—first, his lungs were affected, later, he died in the Beth-Israel Hospital from tuberculous meningitis. This girl's mother also contracted the disease and died not long after.

If the patient had been kept in the hospital, there is no doubt the innocent baby and the mother would not have contracted the disease.

Another case, worth citing—Mr. G. had been ill with tuberculosis for a number of years. His five or six children had died from either brain or lung trouble.

I lost sight of the patient for a few years. Last October I was called to see this man, who was on the verge of death. To my surprise I found that this Mr. G. had been in charge of a fruit and vegetable store near a school in a congested neighbor-

hood in Harlem. The wife of this man told me that he had been attending the store until a few days previous.

This business had been bought for the patient five years ago by a charitable organization, in order to make the family self-supporting. He was doing business there but he was a great menace to the community—many children were among his customers.

I have no doubt that the germs scattered by such an individual caused about as many deaths as are found on the battlefield after war.

While it is true we cannot wholly protect ourselves from the invasion of tuberculosis, we must make most strenuous efforts to protect the lives of our children. It is our duty to safeguard the weak and the helpless. Childhood is the period of life where infection most frequently occurs. Tuberculosis will never be controlled as long as children sleep and eat with tuberculous parents and relatives. Complete isolation is the thing most necessary. It would be a good plan to test infants with the von Pirquet test every six months or more often, as soon as a positive reaction occurs—remove the child from its surroundings.

Compel the state to establish special homes for the children of tuberculous parents. You may call them preventorium or hospitals, but remove the children early in life. We must use all preventive means available; our fight must be waged against tuberculosis and the susceptibility of infants and young children to the disease. Everything possible should be done to fortify children against the disease.

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## MENTAL DEFICIENCY.

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Mental deficiency justly deserves the great attention it is receiving at present; it is not only a medical question, it is of equal interest to the sociologist, criminologist, jurist, philanthropist and educator. Only recently have the educators realized the importance of segregating the mentally deficient children and of establishing separate classes for them; classes which are smaller and where more individual instruction can be given. It is only within the last few years that courts for children have been established, and in the near future medical attendants will be assigned to these courts, to examine the children that come before them. Normal children are not criminals. Criminals are the products of faulty inheritance and faulty environment. It is for these physicians to learn whether a particular child is mentally deficient and thus not responsible for its actions; and it is for them to suggest the treatment. About 15 per cent. of all juvenile criminals are mentally deficient.

Mental deficiency is on the increase, and this subject should interest all those interested in sociology. Laws should be enacted which will define amentia, and those coming under that class should be prohibited from marrying, for of all diseases mental deficiency is most apt to be transmitted by descent. The number of children born to feeble-minded women is twice the number of children born to normal parents.

Aments have no moral sense. Eighty per cent. of single feeble-minded women indulge in prostitution, and a great many feeble-minded women who are married have had illegitimate children before marriage. It is evident that these women must be protected from immoral temptations; the need of institutions for their protection and instruction is great.

THE NUMBER OF MENTALLY DEFICIENT IN THE UNITED STATES.—In the United States there are about 150,000 mentally deficient people; there are also about 180,000 insane and about as many epileptics, so that 1 in every 150 of the population is either idiotic, insane or epileptic.

Owing to an Act of Congress of March 6, 1902, the enumeration of "special classes," which includes the feeble-minded, must be restricted to institutions. In the census report of 1904 there

were 14,169 feeble-minded in institutions. Judging from the ratio of those in institutions and those not in institutions, the above figure of 150,000 is thus obtained.

That the mentally deficient are increasing more rapidly than the total population, a glance at the census reports of the respective decades shows very clearly.

Year.	Population.	Number of Mentally Deficient.
1850	23,191,876	10,000
1860	31,443,321	11,000
1870	35,558,371	25,000.
1880	50,189,209	76,000
1890	62,979,766	95,000
1900	84,233,069	150,000

It is evident, therefore that whereas the population in the last fifty years has increased three and one-half times; the number of mentally deficient in the same period has increased fifteen times.

*Parentage.*—It is interesting to note that 66 per cent. of the mentally deficient are of native parentage, 22 per cent. of foreign parentage, and 15 per cent. of mixed parentage. The proportion of feeble-minded under twenty-five years, however, is greater among the native white children of foreign-born parents than among those of native parents.

*Sex.*—There is a slight preponderance of male over female idiots. In the census report of 1890 there were enumerated 52,000 males and 42,000 females. Of these, 89,000 were white, 6,000 negroes, and 22 Chinese, Japanese and Indians. Of the 14,347 enumerated in 1904, 7,604 were males and 6,723 were females. Of the above figures, 14,169 were white, 178 negroes and 6 Chinese and Indians. The number of negroes is apparently small, but that is due to the fact that there are no institutions in states where negroes are most abundant.

*Institutions.*—The enumeration of 1890 covered the feeble-minded in 20 public and 4 private institutions; the report of 1904 deals with the inmates of 28 public and 14 private institutions; and the number of public institutions has been increased to 31 in 1908. The public institutions are located in 23 states, of which only 3 have more than 1. There are 24 states in which there are no institutions for the feeble-minded; there are sufficient accommodations in institutions for only 10 per cent. of all



the feeble-minded. In the report of 1904 there were enumerated 150,151 insane in institutions, which constitute about 75 per cent. of the total insane in the United States. In New York State, where there are sufficient accommodations in 16 public institutions for 30,000 insane, there are only 4 public institutions for the feeble-minded, with a total capacity of 2,200.

Of the 14,347 in institutions enumerated in the report of 1904, only .6 of 1 per cent. were under five years; 58 per cent. were under twenty years; 85 per cent. were under thirty years, and only 5 per cent. were over forty years; in the adult age groups, relatively more females than males are found; 75 per cent. of those admitted to institutions are between five and twenty years; only 1.7 per cent. are under five years.

ETIOLOGY.—*Heredity.*—Idiocy is acquired in only 10 per cent. of all cases; in 90 per cent. of the cases it is congenital; there is a morbid heredity in 80 per cent. of the congenital cases. Idiocy, epilepsy, neurosis, insanity and congenital deafness or mutism in parents or grandparents may be transmitted to their offspring. Idiocy of all mental derangements is most frequently propagated by descent. Children of epileptics are often insane, idiotic, hysterical or themselves epileptic. Children of the insane are often epileptic, insane or idiotic. There are families in which deafness is transmitted from parents to offspring, and this may go on for many generations and cause mutism and idiocy. Twenty per cent. of the children of feeble-minded women are mentally defective. If both parents are mentally defective all the children are apt to be so too.

In 300 families (where mental deficiency existed), collected from the literature, there were born 2,013 children. Of these, 434 were mentally defective and 160 were criminals or paupers. From these figures one also learns that on the average there are born 6 children in families where either parent is feeble-minded, and as 70 per cent. of such offspring are apt to be mentally deficient, the enactment of laws prohibiting marriage of such people is imperative.

*Epilepsy.*—Epilepsy is both a cause and a complication of idiocy. Thirty per cent. of all idiots have epilepsy and only 20 per cent. of all the children of epileptics are healthy. In no disease is heredity such a strong factor as in epilepsy. In 80 per cent. of the cases epilepsy begins before the twentieth year; the earlier the appearance of epilepsy the earlier do the signs of

mental deficiency appear. When epilepsy occurs in infancy it causes mental defects in 55 per cent. of the children. The relation of birth palsies to mental defects and epilepsy is well shown in Starr's 400 cases of cerebral atrophy. In this collection of 400 cases paralysis was present in 274 cases, mental deficiency in 231 cases and epilepsy in 156 cases. Two-thirds of all infants with birth palsies develop epilepsy, and two-thirds of these epileptics become mentally deficient. More than 50 per cent. of congenital mentally deficient children (without palsies) develop epilepsy. Epilepsy is not only a cause and complication of idiocy, but is also the cause of death in 15 per cent. of all idiots.

*Maternal Causes.*—Mental and physical strain and stress of mother during pregnancy has a great influence on the future mental capacity of the infant. Of 92 infants conceived during the siege of Paris in 1871, not one infant born was thoroughly healthy, and twenty-nine displayed marked mental symptoms. Fright and worry during pregnancy have also some influence, and this may explain the greater proportion of idiocy in illegitimate children. Some claim that in an unconscious way the brain of the fetus feels the influence of the mother's brain; they attribute a real mental life to the child before birth. Malebranche believed that there is a wonderful communication between the mother's brain and that of the fetus, and that the fetus has the same impressions as his mother.

Consanguinity and disparity in age of parents are doubtful factors in the cause of idiocy. If any neuropathic taint be present in a family, marriage of cousins will naturally transmit this taint, like any other abnormality, to their offspring; but if no taint be present it is hard to imagine how consanguinity could have any influence on future offspring. Slight disparity in age of parents seems to have no influence on the future mentality of offspring, but where the difference of ages between parents has been fifteen or more years the birth of idiotic children has been recorded, all other causes being eliminated.

*Toxic Causes.*—Alcoholism in the parents is variously estimated as a cause of idiocy; some think it is a main factor in the causation of idiocy; other think it is not to be considered at all as a cause of idiocy; various authors estimate it to be a cause of idiocy in from 10 to 40 per cent. of all cases.

There have also been reported some cases of idiocy following lead poisoning and other poisons.

*Tuberculosis and Syphilis.*—The most important of the influences conducing to idiocy seems to be the tuberculous diathesis. Two-thirds of all idiots are of scrofulous diathesis and two-thirds of all idiots die of tuberculosis.

Even before the discovery of the Wassermann reaction it was surmised that syphilis must be an important factor in the causation of idiocy. Stillbirths are more common in families where there are idiotic children than in normal families. Thus in 1,269 families there were 245 mentally deficient children and 170 stillbirths. Since the introduction of the Wassermann test many idiots have been subjected to this test. Various results have been obtained. From 2 to 30 per cent. positive Wassermann have been reported; the average of some 800 cases reported is about 10 per cent. Of 200 cases reported by Atwood 6 per cent. gave a positive Wassermann reaction. It is interesting to note that in this series 25 per cent. of the paralytic idiots (47 diplegics, 7 hemiplegics) gave a positive Wassermann reaction. Of 120 cases of atypical idiocy 10 per cent. gave a positive Wasserman reaction.

*Natal Causes.*—Of 2,500 cases reported by Piper, Schwenk and Volker the idiots were the firstborn in 30 per cent. of the cases; labor was prolonged in 6 per cent. of the cases; birth was premature in 6 per cent. of the cases; there was a history of convulsions soon after birth in 32 per cent. of the cases; asphyxia at birth in 6 per cent.; acute infectious disease in 14 per cent.; meningitis and apoplexy in 11 per cent. of the cases.

*Other Causes.*—There have been several cases reported where idiocy followed trauma to head. In one of these cases the idiocy declined after an operation and removal of some cerebrospinal fluid. There have been some cases recorded subsequent to measles, pertussis, scarlet, diphtheria, pneumonia, typhoid and meningitis, probably due to cerebral hemorrhage, or embolism, or thrombosis, or encephalitis brought about by these diseases.

*PATHOLOGY.*—The brains of idiots show no gross lesions in 30 per cent. of the cases. Variations in weight of brains of idiots is far greater than in normal individuals, and the average weight is about 42 ounces (normal, 49 ounces).

The meninges, especially the pia, may have localized or general opacity, and may be toughened and thickened. This is usually most marked over frontal lobe; it may also be adherent.



The dura is adherent in 5 per cent. of the cases; it may also be thickened and studded with tubercles.

The convolutions are diminished in number; they may begin of normal size, but soon diminish in size; the normal pattern of convolutions is often departed from, and the whole brain is often asymmetrical; the convolutions are often simple; macrogyria and microgyria are not infrequently met with. Microscopically, the most frequent condition found is sclerosis in various forms; the most destructive of these is the "sclerose tubereuse." This is seen as one or two areas of white color, hard, elevated, single, more usually multiple. If it occurs in the motor region the paralysis is complete, and if a large portion of cortex is implicated profound idiocy results. In sclerosis the occipital and frontal regions suffer most. Associated with sclerosis usually is atrophy; this may be general or local.

Other conditions met with are microcephaly, macrocephaly, hydrocephaly, porencephalus, cysts and hypertrophy of the brain (usually due to neuroglia), and hypertrophy and thinning of the skull.

Histologically, there is an actual non-development of cells; embryonic cells are sometimes found; pigmentation and chromatolysis are not infrequently noted; thinning of the cortex is sometimes noted and usually due to absence of cells in pyramidal layer; the neuroglia is sometimes in excess and gives rise to excessive weight of brain.

The endymia is usually normal; the blood vessels may be irregularly distributed and may be thinned or thickened; the cerebrospinal fluid is usually superabundant.

The cerebellum may show complete failure of development of one or both spheres; it may also show sclerosis or atrophy or both, and may show macro- or microgyria, agyria or heterotopia. The medulla may be deformed or split in two parts.

**SYMPTOMS.**—(1) *General Physical Backwardness.*—In idiots the physical development is backward from birth. The sutures do not ossify and the fontanels do not close till late. In normal children the first voluntary movements may be noted at four months. When the trunk is supported these infants are able to hold their head erect at four months, and to sit up at seven months. Attempts to stand are made at nine to ten months, and walking is usually attempted at twelve to thirteen months; nor-



mal children usually walk freely at fourteen to fifteen months. In idiotic children voluntary movements may not be noted before the end of the first year. Supporting of head, standing and attempts at walking are all delayed. These children seldom begin to walk before two and one-half to three years. Dentition is also very much delayed; it is latest in cretinism. As a rule, idiots are undersized and under weight for their age. As early as the sixth day a normal infant will follow a light. Coördinate muscular action of the eyes is established at three months. Objects are recognized at six months and the voice of parents at three and one-half months. An idiotic child will not follow a light, and but few of them recognize their parents and objects at one year.

In normal infants first attempts to speak are made at about one year (papa-mamma); short sentences of two and three words at two years. Progress is rapid after this. If a child at two years makes no attempt to speak some mental defect may usually be inferred. The majority of idiots seldom acquire speech before three and one-half to four years. Twenty per cent. of idiots fail to acquire speech.

At three years normal children will play and build with bricks and know the names and uses of common objects. At four to five years they know letters and are able to count. At six they can read, spell and write simple words of one syllable. Idiots cannot accomplish this before they are advanced in years. Some never reach this state of development even in maturity.

For the first twenty-four hours after birth most infants are deaf. Touch is present at birth; taste is highly developed from birth; smell is present in newly-born and is especially acute in infants born blind. In idiots touch is often imperfect, but total lack of insensibility to pain, as in the insane, is not present; abnormal sensations are not often met with; sight is generally good; some idiots are born deaf, and there are all grades of deafness noted among idiots; taste is deficient in many idiots; smell is deficient, but not in as many as is taste.

*Carpal Development and Mental State.*—X-ray determination of carpal ossification as an index of mental deficiency is of no value. Long and Caldwell found no relation between the degree of carpal development and quality of mind. "Some idiots are as far advanced in carpal ossification as some normal children of good mentality and similar chronologic age."

(2) *Physical Signs.*—Mentally deficient children are deficient physically as well as mentally. Many have deficiencies which are known to be stigmata of degeneration. Stigmata *per se* have no diagnostic value; they are only of corroborative value. Not a few normal children have stigmata; but where mental deficiency is suspected the presence of stigmata is of great value in confirming the diagnosis.

The cranium is the most common seat of abnormalities; it may be abnormal in size, shape, asymmetrical, bossed or ridged. In fully half these children the circumference of the head is usually from one-half to four inches less than in normal children. (The discrepancy becomes more marked at sixteen years.) Next come defects or abnormalities in palate, ear, eye and appendages.

Abnormalities of nerve action are frequent. Some are heavy, stolid and tardy in response; in others the reverse is the case. All movement is in excess; they cannot stand or sit still, but co-ordination of movement is but slowly and laboriously acquired.

*The Head.*—There may be general asymmetry of the head; bosses and ridges are frequently met with; it may be microcephalic, hydrocephalic, bradycephalic, oxycephalic or dolichocephalic; the variability in size of the head in idiots exceeds that of the normal individuals to a marked degree. With the exception of hydrocephalic cases, the circumference of the heads of idiots is from one to three inches smaller than in normal individuals.

*The Palate and the Teeth.*—The palate is normal in about 50 per cent. of the cases; it is narrow and high in the great number of those deformed; it may be wide and flat or otherwise deformed. The teeth are often defective; they are irregular in arrangement, size and shape; some cannot close the mouth, only the molars coming in apposition. The vomer may project into nasopharynx and may obstruct respiration. This is most usually found in Mongolian idiocy.

*The Ears and the Eyes.*—Deafness may be congenital. There are all grades of deafness noted among idiots; differences in size and shape of the ears, different position and large and prominent ears are not infrequently met with.

The sight is generally good; malformations of the iris are not uncommon; blindness may be congenital. Unequal pupils, squint, ptosis, congenital cataract and nystagmus, either alone

or in combination, are found in 15 per cent. of idiots. Nystagmus is far more common in idiots than in normal children. The ophthalmoscope is of great value in determining the presence and the type of idiocy. Thus the presence of an optic nerve atrophy with a cherry-red spot in the macular region is pathognomonic of amaurotic family idiocy. If an idiot shows a retinchoroiditis the idiocy is probably of luetic origin; if there be opacities of the vitreous or if the iris shows remains of previous inflammation, the idiocy is very likely of luetic origin.

Cohn has found in the feeble-minded a pallor of the temporal half and edema of the nasal half of the disc in 7 of 29 cases; slight atrophy of the optic nerves was found in 6 of the cases. Of 24 imbeciles examined, 4 showed above changes. A normal fundal appearance was present in but 2 of 53 cases of idiocy examined; 1 showed general congestion of the entire disc; 8 presented a generalized pallor of the discs; optic atrophy was present in 3 of the cases.

*Speech Defects.*—About 20 per cent. of all idiots fail to acquire the power of speech. In a great many it is defective; some have abnormality of the sensory apparatus, as deafness; others have abnormality of the motor apparatus (*i.e.*, diporthria); thus we may have aphonia, stammering, stuttering, slurring, scanning, strengthening of syllables, opthongia and bradylalia; in still others psychical defects of speech are present, as noise-making, lalling, idioglassia, agrammatism, echolalia, verbigeration, word blindness and word deafness.

*Muscular Signs.*—About 10 per cent. of all idiots suffer from some sort of paralysis. Arranged in frequency are paraplegia, hemiplegia, paralysis of all limbs, facial paralysis. Tics (all sorts of movements) are present in about 12 per cent. of all cases; reflexes are variable, may be normal, increased or decreased. Ambidexterity more common than in normal children. A form of writing known as "mirror writing" is not infrequently seen in idiots.

The gait is often peculiar; may be slouchy; others having a stepping gait; not a few drag their feet; others raise their feet and bring them down like tabetics; the hemiplegics and the diplegics have the gait peculiar to these diseases.

*Expression and Disposition.*—The expression is inane; the lines of intelligence are absent; many have a permanent silly smile; they may have outbursts of laughter out of proportion to



anything that has been said or done; the same is true of crying. In disposition, extremes are more apt to be present than a normal disposition; some are very good, others are very bad; it is not at all unusual for a mother to say that her idiotic baby is very good, and that it always smiles; more significant is it to hear a mother state that "her baby is always crying and for no reason at all."



FIG. 1.—A case of Mongolian Idiocy in a colored infant.  
[Introduced because of the rarity of the condition among negroes.—Ed.]

*Other Stigmata.*—Other stigmata occasionally met with are drooling, hypertrichosis, especially of the back, and deformities of the hands and feet. The thumb and little finger are usually too short in comparison with the other fingers; all the fingers may be stubbed, as in cretinism; some have tapering fingers, especially marked in Mongolian idiocy; incurvation of last phalanx of little finger, a stigma of degeneration found in all forms of idiocy, is more commonly present in Mongolian idiocy; many have webbed fingers and toes; the small toe may be very small.

The tongue is usually hypertrophied and projects from the mouth, to which cause the drooling is partly due; the papillæ may be enlarged or it may be fissured (Mongolian idiocy).

*Abnormal Mobility and Abnormal Movements.*—Abnormalities of nerve action are frequent; some are heavy, stolid and tardy in response; in others the reverse is true. All movement



is in excess; they cannot stand or sit still. The study of movement constitutes one of the important chapters of the psychology of the child. The vivacity and the regularity of the motions of the infant are a sign of present physical health and of future intellectual activity. The motions of normal children, numerous and varied, within a few days pass from a state of disorder and chaos to a state of progressive coördination. In idiotic children there is inactivity, obstinate immobility, or absolute lack of coördination in irregular movements that are abundant. In one sense the future intelligence shows itself in the way in which a child sucks; a real difficulty in sucking has been observed in idiots from birth.

Nearly all idiots have some kind of abnormal movements. About 30 per cent. of all idiots have movements which are frequently or constantly repeated and from which the patients seem to derive pleasure or satisfaction. These move-

ments Clarke and Atwood designate as "habit movements."

The above authors claim that all "habit movements" bear some relation to or suggest a sexual libido. The most common "habit movements" noted by them are finger sucking and pelvic rocking. In their experience nearly all adult idiots are masturbators; whereas, in idiots under the age of puberty masturbation is rather infrequent, and habit movements are very common. "All of the habit movements noted bear some relation to or



FIG. 2.—Same child as Fig. 1, showing characteristic slanting eyes.

suggest a sexual libido." They are of the opinion that in young imbeciles "habit movements" take the place of masturbation.

In neurotic children that are not idiotic thumb sucking and masturbation are often associated; and knowing the former bad habit to be present, the latter may be suspected and is not infrequently found.

PSYCHICAL DIAGNOSIS.—The cognitive element is the least developed of the three elements of consciousness, the other two being volition and emotion. Some idiots are mentally so low that they cannot transform sensations into perceptions. Apperception is very poor; the ties of association are few and insignificant; retention is therefore poor and memory is fleeting. Attention is defective; when gained it is with difficulty held. Perceptions are few and as memory depends on perceptions the memory must suffer consequently. Idiots have little or no imagination; they are imitators rather than originators. Thinking, which is based on perception, memory and imagination, must of necessity be limited. Many idiots are not capable of thinking, reasoning or drawing conclusions. Only few of them are able to grasp abstract ideas. Emotions are weak and evanescent. The religious sentiment is of a decidedly poor order. The will is very poorly developed; in some not all.

*Classification.*—The classification here suggested is a clinical one. (See classification.) It is of first importance to ascertain whether the deficiency is primary (*i.e.*, congenital) or secondary (*i.e.*, acquired). These two groups are next divided into two subdivisions. A includes those cases of mental deficiency which are a definite entity and which may be diagnosticated from the characteristic physical signs which accompany these cases of mental deficiency. Each forms a definite type (of mental deficiency), and it is for that reason that the term typical is applied to them. B includes those cases of mental deficiency which have no characteristic physical signs; they are therefore atypical and the diagnosis must be made on the mental state of these patients. Many of these have stigmata of degeneration, but no two cases have the same physical signs.

The causes which may lead to atypical idiocy are enumerated in the classification. (See diagram.)

Epilepsy, convulsions and paralysis are really complications of idiocy and not types nor causes of idiocy. In a very small per cent. of cases it is true epilepsy precedes idiocy. In a great

majority of cases, however, it either follows idiocy or its presence is due to the same cause to which the idiocy is due; the same is true of convulsions and paralysis.

The terms define themselves. By "asensorial" idiocy is meant idiocy which is dependent upon deprivation of one or more senses.

The relative frequency of the different types is given in Table II. Table I. is a classification of 300 cases seen in the pediatric department at the Vanderbilt Clinic. In the 12 amaurotic cases reported, the fundi were examined and the cherry-red spot was found in each case. Of the 12 asensorial cases 3 were primary and 5 were due to meningitis. The post-paralysis cases were all cases of idiocy following congenital spastic diplegia.

Table II. is a composite table of 700 cases—300 from the Vanderbilt Clinic, 100 Lapage and 350 Still's cases.

The discrepancy in percentages of occurrence of amaurotic family idiocy and hydrocephalic idiocy in the report of the Vanderbilt Clinic cases and those of Lapage and Still is partly due to the fact that the majority of the children seen at the clinic are below six years; whereas, the statistics of Lapage and Still are taken from institutions where fewer children below six are admitted. As amaurotic idiots usually die between the age of two and two and one-half years, and 94 per cent. of hydrocephalics die before the age of seven, it will be readily understood why this discrepancy in figures arises.

TABLE I.

ANALYSIS OF 300 CASES OF MENTAL DEFICIENCY AT THE VANDERBILT CLINIC, PEDIATRIC DEPARTMENT.\*

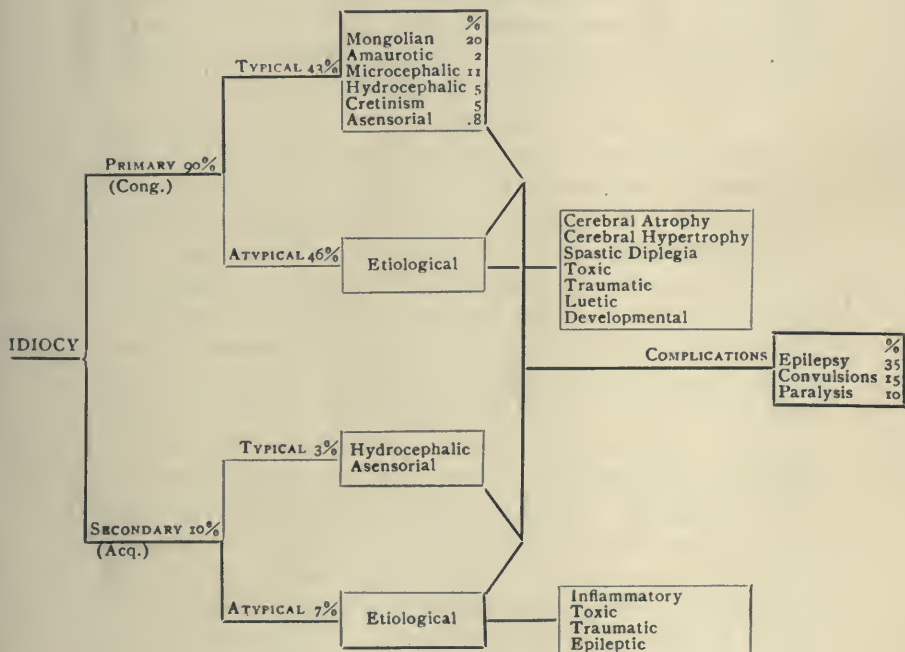
	Males.	Females.	Total.	Per cent.
Mongolian .....	34	39	73	24 $\frac{1}{2}$
Amaurotic .....	6	6	12	4
Microcephalic .....	22	22	44	14 $\frac{2}{3}$
Hydrocephalic .....	19	23	42	14
Cretinism .....	3	15	18	6
Asensorial .....	4	4	8	2 $\frac{2}{3}$
Atypical .....	53	28	81	27
Postmeningitis .....	3	6	9	3
Postparalysis .....	10	3	13	4 $\frac{1}{3}$
	—	—	—	—
	154	146	300	100

\* Since the article was written, we have seen 97 more cases of mental deficiency in the Pediatric Department. They were distributed as follows: Mongolian, 18 (1 a negro); amaurotic, 3; microcephalic, 16; hydrocephalic, 7; cretinism, 1; asensorial, 3; postmeningitis, 2; atypical, 47.

TABLE II.  
ANALYSIS OF 750 CASES OF MENTAL DEFICIENCY.

	Reuben, 300.	Lapage, 100.	Still, 350.	Total.	Per cent.
Mongolian .....	24 $\frac{1}{2}$	16	22	62 $\frac{1}{2}$	20+
Amaurotic .....	4	0	0	4	1+
Microcephalic .....	14 $\frac{3}{4}$	11	6	31 $\frac{3}{4}$	10+
Macrocephalic (hydro) ..	14	0	$\frac{1}{2}$	14 $\frac{1}{2}$	4+
Asensorial .....	2 $\frac{3}{4}$	0	0	2 $\frac{3}{4}$	1+
Cretinism .....	6	7	2.8	15.8	5+
Atypical .....	27	54	54	135	45
Postmeningitis .....	3	3	$\frac{1}{2}$	9 $\frac{1}{2}$	3
Postparalysis .....	4 $\frac{1}{2}$	7	7	18 $\frac{1}{2}$	6
Traumatic .....	0	0	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Postmeasles .....		2		2	$\frac{2}{3}$
Epileptic .....			6	6	2

## CLASSIFICATION.



DIAGNOSIS.—Although over 50 per cent. of all idiots do not belong to any definite types, there is very little space devoted to atypical idiocy in most text-books which contain lengthy de-



scriptions of cretinism, amaurotic family idiocy, and other typical forms of idiocy.

In the diagnosis of atypical idiocy the family history is most important. There is a morbid heredity in 70 per cent. of the cases. The condition is usually present at birth; in a few a real difficulty in sucking has been observed from birth; and if all mechanical causes can be ruled out mental deficiency should be suspected. Dentition, walking and speech are all delayed. These children are undersized and underweight for their age. Stigmata of degeneration are present in many. The cranium is the most common seat of defect; next come deficiencies in palate, ear, eye and appendages. Abnormal nerve signs are present; there is apt to be either torpor or restlessness and abnormal movements when present are pathognomonic of idiocy.

It is most important to differentiate mental deficiency from mental backwardness. In mental backwardness the family history is good; the condition is usually not present at birth; this condition is usually secondary to any prolonged illness or to any sensory defect, as deafness, refractive errors or adenoids, and the condition improves when the exciting cause is removed.

Dentition, walking and speech are not delayed, for the causes of mental backwardness usually do not operate till the children are three or four years of age. Stigmata of degeneration are absent; head measurements are normal. These children usually are not undersized and not underweight; when so the condition is only temporary; whereas, mentally deficient children are always undersized and underweight for their age. Idiocy is not curable, but is subject to various grades of improvement, whereas mental backwardness disappears entirely when the exciting cause is removed. A mentally backward child outgrows its backwardness, but a mentally deficient child never outlives its deficiency. Abnormal nerve signs and abnormal movements are not noted among mentally backward children. The mortality among mentally deficient children is about ten times as great as it is among mentally backward children.

*Number of Idiots in One Family.*—If both parents are feeble-minded all the offspring are apt to be mentally deficient. If one of the parents be deficient then about one-half of the offspring will be mentally deficient. Not infrequently amentia does not appear in the direct offspring, but reappears with greater force in grandchildren.

Amaurotic family idiocy usually affects more than one child in the same family; may affect as many as 2, 3, 4 or 5 children.

Microcephaly may affect 2, 3, 4 or 5 children in the same family. There are also reported twin microcephalics.

Cretinism, where endemic, usually affects more than one member of the same family. Among the 18 cretins observed in the pediatric department at the Vanderbilt Clinic, there were two families in which there were 2 similarly affected; all were born in New York City.

Among the 73 Mongolian idiots there were two families in which 2 were similarly affected.

Deaf-mutism, when congenital, usually affects more than one member of the same family.

In nearly all the cases where there were more than one mentally deficient children, the first born was affected. This was especially true of atypical cases. In a general way it may be stated that in atypical idiocy if there be a mentally deficient child and it is not the first born, that the probability is that there will be no more mentally deficient children born; but if the first born be mentally deficient, then one of the later born may be deficient also.

PROGNOSIS.—In general terms, those suffering from primary amentia (congenital cases) are capable of more improvement than the secondary cases. The stunted, misshapen, often repulsive-looking victims of morbid heredity are more responsive to training than are well-grown and well-formed idiots, who suffer from accidental injury or disease of the brain. In the congenital cases the result is hopeful or the reverse, in direct proportion to the degree of deficiency and the presence of epilepsy or paralysis.

In microcephalic cases, except in extreme cases, a considerable amount of improvement may take place. These patients become capable of performing many simple routine tasks.

In Mongolian idiocy the prognosis is directly proportionate to the intensity of bodily signs.

In epileptic idiots prognosis is decidedly unfavorable, and is one of the most hopeless variety.

In sclerotic idiocy, most hopeful cases are those in which enlargement of skull takes place.

The prognosis in syphilitic idiots is bad owing to the development of general paresis.

Hydrocephalus is the most fatal nerve disease of early childhood; 94 per cent. die before they reach the age of seven years.

*Longevity and Causes of Death.*—Seventy per cent. of all idiots die before twenty years; 23 per cent. live to be between twenty and thirty-five years; 3 per cent. live to the age of thirty-five to forty-five years, and  $3\frac{1}{2}$  per cent. live from forty-five to eighty-four years. Between the ages of five and twenty mortality is ten times as great as it is in normal individuals.

The most common cause of death is tuberculosis, mostly pulmonary. Tuberculosis is responsible for about 50 per cent. of the deaths of idiots; next in importance as a cause of death are diseases of nervous system, especially epilepsy (about 25 per cent.). Diseases of the respiratory tract other than tuberculosis are the cause of death in about 15 per cent. All other causes combined are responsible for the remaining 10 per cent. of deaths.

1967 7th Avenue.

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TYPHOID FEVER IN NURSINGS.—A. Brelet (*Gaz. des Hôp.*) notes that typical typhoid fever in infants is rare, although the infection is rather frequent and of grave import. It is characterized by continuous fever, digestive disturbances, sometimes severe meningitic symptoms, purpura, convulsions, intestinal hemorrhages, etc. There may be no ulceration of Peyer's patches or solitary follicles, but hemorrhage may occur from the intestinal walls. The spleen and mesenteric glands are enlarged. Rose spots may be present, but are usually absent. Owing to the irregularity of the course of the disease, the diagnosis is often not made; the Widal reaction is not always present, but bacteriologic examination of the feces shows the bacillus of Eberth. Bronchopneumonia may be a prominent symptom. The disease is exceptional during the first six months of life; if it occurs in the mother during pregnancy the infant generally dies *in utero* or it may live but a few days. The child may be infected by the mother while at the breast or by a nurse.—*Medical Record.*



## CERTIFIED MILK.\*

BY HENRY L. COIT, M.D.,

Newark, N. J.

The object of this meeting, I understand, is to advance the cause of certified milk. The Philadelphia Pediatric Society represents several important relations to the pure milk movement and has furnished some of its most efficient crusaders.

The President's reference to my pioneer relations to this movement makes me feel somewhat like an ancient curiosity brought for exhibition. When we look back over almost a lifetime at the milk conditions in the 1880's, we find that it was one of the most uncultivated fields in sanitary and prophylactic science.

Everyone who had to do with the production of milk, or with the use of milk, was a law unto himself. Those who produced it had only commercial purposes, and those who used it had little knowledge of its vital relations to health, or its causative relations to disease, and the altruism of its use by philanthropy for the prevention of infant mortality was never dreamed of.

In 1888, through the necessity growing out of a personal need for clean milk in the feeding of infants and young children, it was discovered that the milk conditions in large cities everywhere were inimical to health and safety, and that legislation could not be depended upon to afford relief. Municipal health departments had not yet realized their duty toward the public in this matter. It was the realization of the fact that clean milk was one of the most urgent fundamental questions presented for public and professional consideration that the speaker was led to ask for its investigation by the Medical Society of New Jersey in 1889.

After two years' study of the problem a committee of forty-two physicians concluded that as a public, economic and medical question it was of sufficient importance to engage the influence and coöperation of the entire medical profession.

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\* An Address delivered by invitation before the Philadelphia Pediatric Society in the College of Physicians, May 18, 1912.



A legislative committee was asked for and appointed, and after several months of effort through the state departments controlling health, agriculture and food, legislation as a means of relief was abandoned for the time being, and the speaker formulated a plan by which it was sought to obtain relief for the immediate locality in which he lived.

Because of the urgent clinical aspects of this question which appealed so strongly to physicians, it was not difficult to secure their coöperation in an organized effort for reform. Accordingly, in 1892, the plan which had been several years in preparation was presented to the Practitioners' Club in Newark, and met with its endorsement. The plan was without precedent, and provided for a commission of medical men which, by voluntary supervision and control of methods, paid expert inspection of dairy work and final certification of the product, undertook to influence a supply of milk produced under regulations imposed by themselves which should fulfil the most exacting requirements of the physician.

This original commission was appointed by the Practitioners' Club and is still known as the Essex County Medical Milk Commission. Its pioneer work was performed with many misgivings, and with great expenditure of time and thought. Passing through many vicissitudes, its plans were formulated, after many years, in the comprehensive state law which now protects the professional interests of the milk commission and every feature of medical milk commission activity.

Following the lead of the original commission, a second similar organization was appointed in New York City by the New York County Medical Society in 1896. The following year the third commission was organized in Philadelphia by the Society whose guest I have the honor to be. This commission, I wish to state, has carried the system to the highest degree of perfection, both in the matter of a comprehensive supervision of methods and in the acquisition of the highest standards of purity in the milk obtained.

The Medical Milk Commission and its work has spread abroad and is now not only a leader in the pure milk movement in sixty or seventy cities, but in many respects has been responsible for the world-wide crusade. Seventy Medical Milk Commissions have been organized in twenty states of our own country, with several representatives in foreign countries.

In 1906 the Medical Milk Commissions were federated into a national association designed to extend the system to other cities and to harmonize and elevate the standards for certified milk. These Commissions have not all realized the importance of the work which they were organized to perform, and some of them have lapsed into indifference and have not been aggressive leaders in the communities in which they exist.

The Medical Milk Commission represents a well-balanced system, which includes a medical society appointment, the personnel of the Commission being deeply interested and willing to devote their time and labor without pay, a dairyman or dairymen with honor, financial ability and proper facilities, competent experts for employment in the supervision of the hygienic, biologic, veterinary and medical control of the dairy or dairies, systematic and complete reports upon these four lines of supervision and, finally, certification of the product by the Commission.

The milk is designed to fulfill standards of quality, purity and safety to insure its adaptability for clinical purposes and the feeding of infants. The certificate of the Commission constitutes its authorization for the use of the term "Certified." The certification is based upon the fulfilment of prescribed medical requirements for the milk and is the guarantee that it conforms to definite standards and to fixed methods and regulations for its production.

The standards of quality consist of fresh, whole milk, unchanged by heat or cold, less than twenty-four hours old when sold, held between the temperatures of 48° and 50° F., with not less than 12 per cent. of total solids, with fat content between 3.5 and 4.5 per cent. and without the addition of any other substance, material, chemical or preservative.

The standards of purity for the milk consist of the entire absence of particles of foreign matter, of the lowest possible bacterial and dust-dropping content consistent with the highest possible practice of dairy hygiene, provided that the numerical bacterial contamination is at all times below an average weekly count of 10,000 per cubic centimeter.

The standards of safety consist in the use of every known means to exclude from the milk pathogenic microorganisms, a medical guarantee that every employee handling the milk is free from disease and is not a disease-carrier, and a veterinary guar-

antee that the cattle are in perfect health and cannot transmit through the milk any bovine affection.

The methods and regulations for the production of certified milk are those adopted from time to time by the American Association of Medical Milk Commissions; they are based upon the most advanced clinical requirements, prophylactic science and dairy husbandry and are changed as the action of the Association modifies its technique for the attainment of its standards.

The principles involved in the system are cleanliness, caution and control. Cleanliness as applied to everything and everybody; caution as applied at every step in the collection, handling and transportation of the milk; control as exemplified in the contract supervision of methods of production from the first step to the final delivery of the product.

The functions of the Commission are. First, leadership by taking the initial steps in obtaining the highest grade of milk for medical purposes. Second, arousing the interest of the public and profession in pure milk. Third, instituting the control of production for the grade of milk known as "Certified." Fourth, teaching the profession and the public how to use clean milk in order to protect and preserve human life.

A Medical Milk Commission which fails to carry out any one or more of the above essential parts of the system does not represent the system. The product which such Commissions permit to be called certified represents a serious menace to the certified milk system. Such certification establishes a false security in the minds of physicians and the public who have learned to trust the system and the name. Such certification savors of deception and, as respects the milk itself, is a misbranding and falsification. The work of such Commissions is a detriment to the cause of certified milk and reflects upon the reputation and diminishes the influence of the American Association of Medical Milk Commissions. A few such Commissions have, unfortunately, gained admission to our Association. No chain is stronger than its weakest link and any Commission which weakens the strength of this national chain should not be tolerated as a factor in the government or legislation of the Association.

I have been asked to state some of the advantages of certified milk.

There is an apparent disadvantage in the market value of



this grade of milk which cannot be fixed below 15 cents per quart, but when one reflects that the food value of a quart of certified milk cannot be duplicated for 15 cents by any other combination of foods obtainable in the market, this imaginary disadvantage disappears.

Chief among the advantages of certified milk are:—

(1) Its reliability in the treatment of dietetic and nutritional disorders of childhood.

(2) Its freedom from pathogenic bacteria, from the bacillus of tuberculosis and from the causes of epidemic disease.

(3) Its freedom from large numbers of microorganisms, and on account of its clean and proper handling, absence of visible dirt and gross contaminations.

(4) Its unvarying resistance to early fermentative change, so that it may be kept under ordinary conditions without extraordinary care.

(5) Its constant nutritive value, its known chemical composition, and its easy adaptability to the needs of invalids and children.

(6) Its delivery to the consumer within twenty-four hours of the milking as against market milk, which is often two or three days old.

(7) Its purity and freedom from adulteration, coloring matter, chemical substances and preservatives.

(8) Its freedom from animal odor, its sweet taste and acceptability to persons with delicate and sensitive digestion.

(9) Its high standard of total solids and well-balanced food values, which is always of a guaranteed uniformity.

(10) Its low protein content, which renders it more useful for the substitute feeding of infants.

(11) Its safety as a food for infants, under favorable conditions of environment, without sterilization.

(12) The confidence and security of the public resulting from the sponsorship of the physicians certifying to the purity of the milk.

We believe that it will be universally granted that the acquisition of certified milk constitutes one of the most important steps in the prophylactic hygiene of infancy and childhood.

*277 Mt. Prospect Avenue.*



## SOCIETY REPORTS.

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### THE PHILADELPHIA PEDIATRIC SOCIETY.

*Joint Meeting with the Philadelphia Obstetrical Society,  
April 9, 1912.*

THEODORE L. E. BOUTILLIER, M.D., PRESIDENT.

#### SYMPOSIUM ON MATERNAL NURSING.

##### THE ABILITY OF MOTHERS TO NURSE THEIR OFFSPRING.

DR. J. P. CROZER GRIFFITH, who quoted a great mass of statistics, showed the high mortality rate in the first year of life and its dependence upon the employment of artificial feeding. He discussed three questions—the number of mothers who nurse their offspring, the number capable of nursing, and the cause of the failure of women to nurse their infants. The statistics quoted show that, although there had been a decided diminution in the frequency of nursing formerly, there was now an increase in the number of babies fed upon the breast. In the majority of cases there is not so much a lack of ability as a lack of willingness to nurse their offspring.

##### THE PREPARATION FOR NURSING AND THE CARE OF THE NURSING MOTHER.

DR. E. P. DAVIS, by invitation, said that anatomic defects in the nipple may exist. Gentle pressure may evert a sunken nipple; this is better than the use of a breast pump before delivery. Congenital cleft or fissured nipples should be treated by cleansing and an antiseptic ointment. Massage of the breast of pregnant women was not advised. The greatest obstacles to successful lactation are a disordered nervous system and the toxemia of pregnancy, due to failure of the ductless glands to act. For the latter, small doses of thyroid extract should be

given over long periods during pregnancy. The essentials of diet during pregnancy are milk, fruit and bread. During labor sepsis, hemorrhage and exhaustion must be avoided. To promote lactation the mother should nurse the infant at regular intervals, two and one-half to three hours; should have much fluid, but no alcohol; and good, digestible food. Arsenic is the best tonic. Dr. Davis recommends a supporting breast bandage.

THE TREATMENT OF MAMMARY DISEASE WITHOUT THE DISCONTINUANCE OF BREAST FEEDING.

DR. BARTON COOKE HIRST, by invitation, showed a series of plates of the common and rare diseases of the breasts, and discussed the treatment of each.

METHODS OF INCREASING THE MAMMARY FUNCTION AND CONTRAINDICATIONS TO NURSING.

DR. M. H. FUSSELL said that many so-called contraindications to nursing exist only in the minds of the laity. Social duties are no reason for not nursing a baby. No duty is superior to rearing a healthy child. Physical inability to nurse is generally imaginary. Cleanliness and care will prevent infection of the nipples. Mastitis will require rest from nursing for a time only. Former inability to nurse a baby is no reason for not nursing a later infant. Illness and failure to secrete milk will need careful treatment, by fresh air, exercise, diet, etc. The baby must be nursed at regular intervals; the mother must be shielded from fright or excitement; daily exercise and rest are important; so is the diet. While in a few instances infants may have to be weaned, the majority of mothers can nurse their offspring with care, firm conviction and persistence.

DR. R. C. NORRIS, in opening the discussion, said that the matter of infant feeding very properly passes out of the hands of the obstetrician early and the responsibility rests upon the pediatricist. So far as the ability of the woman to nurse the child is concerned, the obstetrician has observation for only a short period. Bottle-fed babies are unknown in hospital work. In private cases, the higher we go in the scale of intelligence the

less do we find indisposition to nurse the baby. Women have begun to return to their mothers' viewpoint. We should utilize breast milk as long as we can. No one seems to have laid sufficient stress upon combined feeding. The mother should be taught that when her milk begins to fail she should seek instruction in the combination of breast and artificial feeding. In inverted nipples, it is his experience that little can be done in the way of ointments or breast pumps. The baby is the best means of drawing them out; sometimes a shield called the "Infantibus" will succeed. This acts like an old-fashioned sucker in that baby takes hold of the nipple and thus produces a vacuum. In the preparation of the nipples for nursing all that is needed is to keep the nipples clean. Astringent preparations and ointments are of little service. During nursing, the more is done to the nipples the worse they get. They will heal up, if in bad condition, by applying the lead nipples described by Dr. Hirst. Dr. Norris has abandoned massage of the puerperal breast, now using hot compresses. The only laxative he uses, besides salines, is cascara. For small fissures of the breast, easily recognized by applying a water and alcohol compress, he uses bismuth and castor oil. While encouraging women to nurse their babies, the moment the child begins to be restless, loses weight and cries, Dr. Norris gives artificial food in addition to the breast. He believes that if we bring artificial feeding of the infant to a higher plane of scientific accuracy, and the knowledge of the specialist becomes the knowledge of the general profession, we shall have less infantile mortality.

Dr. G. M. Boyd said that the obstetrician sees the baby for two weeks to a month, when it is referred to the family physician. The obstetrician should do all in his power to persuade the mother to nurse her child. This work begins during pregnancy, in painstaking care. By using the jacket bandage we do not have engorged breasts. The pressure of the bandage is increased if the supply is greater than the demand and the patient is purged and starved. Seldom resort to massage, the rule being "hands off." The mother needs sufficient rest after delivery. Dr. Boyd was glad to hear Dr. Hirst speak of the possibility of re-establishing lactation after weeks of cessation. We are often too ready to place the infant upon artificial food.

DR. T. S. WESTCOTT spoke a word of defence for American women of the better class. Very few women are not anxious to nurse their children. But it is appalling how frequently a satisfactory breast supply is ruthlessly sacrificed on the advice of someone, often a trained nurse. Dr. Griffith has wisely emphasized the point that we should not hasten to give up breast-feeding for minor reasons. The weight chart should be kept weekly and carefully studied by the physician. A gain of from 8 to 12 ounces can be secured weekly under favorable circumstances. When a baby only gains 2 or 3 ounces a week, after a trial of four or five weeks, supplement the mother's feeding by first one bottle and gradually increase the number until weaning is accomplished. It may take a month or two before the last drop of milk is given up. The mother's secretion will not be affected by one or two bottles daily, but giving three or four bottles diminishes the output rapidly. In some cases the bottle may follow each feeding. The infant whose digestive power agrees best with the formula of the mother's milk is the one that makes the best out of it. It is important to avoid overfeeding the infant. Dr. Westcott advised whey in addition to the low proteid of ordinary milk mixtures.

DR. E. E. GRAHAM said that the artificially-fed babies show the highest mortality. This is especially true among the poor. The matter comes back to educating the poor in the bottle-feeding of infants. He allows the baby one bottle a day from the earliest period of infancy. The ability of women to begin re-nursing babies is most important. Babies weaned from two to six weeks earlier can often be brought back to the mother's breast.

DR. ELEANOR C. JONES laid stress upon putting the baby to the mother's breasts early, not waiting until twelve, or even twenty-four, hours after delivery. Mothers need plenty of fluids. Practically all the sick babies are bottle-fed. It is not a question of teaching the poor how to feed the baby artificially. Physicians should impress on other physicians and mothers the necessity for urging mothers to keep babies on the breast. Until this sentiment is created the average physician is quite ready, with the first intimation that the baby is not doing well, to suggest the bottle. In many cases, if the baby is kept on the breast,



even though not gaining, and artificial food begun later, it does better than if taken off the breast early. The nurse is only the reflex of the physician; when the physicians universally declare the importance of the mother nursing her baby, the nurse will follow suit.

DR. MAURICE OSTHEIMER said that the Children's Aid Society of Pennsylvania has established a Directory and Bureau of Registration for Wet-Nurses and at present has eight or more babies in homes of wet-nurses. They hope in the future to be able to have a sufficient number of wet-nurses to supply requests for them. The Society's physician makes Wassermann and tuberculin tests upon the mothers and the infants, thus carrying on the work in a scientific manner.

DR. GRIFFITH added that the work of the Children's Aid Society arose from the difficulty in having some of the children satisfactorily fed in the University Hospital. They desired to find homes where women will nurse babies from the hospital besides their own babies. Nurses and physicians will supervise this work, to see that each baby is properly fed and cared for. After we have created a sentiment among the people for this, the project will succeed, as New York already has a satisfactory Directory for Wet-Nurses. The Children's Aid Society deserves all the help which we can give them in this matter.

DR. FUSSELL stated that the trained nurse is not responsible for the prevalence of bottle-feeding, but rather meddling neighbors and friends. After a baby once tastes bottle milk it is hard to continue nursing. For that reason alone he puts off supplemental feeding as long as possible. This question of the wet-nurse is an extremely important one and should be left in the hands of the Children's Aid Society of Pennsylvania.

A motion, made by Dr. Hirst and amended by Dr. Carpenter, was then carried—that a joint committee, formed of members of both the Philadelphia Obstetrical Society and the Philadelphia Pediatric Society, be appointed to confer with the Children's Aid Society, to endorse their work in securing competent wet-nurses, and to aid them in preparing a Directory and Bureau of Registration for Wet-Nurses.

## THE PHILADELPHIA PEDIATRIC SOCIETY.

*May 14, 1912.*

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

## THE ADVANTAGES OF CERTIFIED MILK.

DR. HENRY L. COIT, of Newark, N. J., delivered an address upon this subject, by invitation. (See p. 613.)

DR. ALFRED HAND, JR., said that the work of the Milk Commission of the Philadelphia Pediatric Society was begun twelve years ago, after a year of study of the conditions of milk production by a committee specially appointed for the purpose. Following somewhat the lines of Dr. Coit's Commission in Newark, and being the third in point of time, it was the first to issue certificates to more than one dairy, as the New York and Newark Commissions limited their certificates to the product of one dairy each. The original requirements of the Philadelphia Commission were drawn up by people who knew nothing about the practical side of milk production, but it is interesting to note that the strictness of those requirements have not been lessened in any way and that the producers themselves admit that the aim was good. It would be almost possible to lower the bacterial standard from 10,000 germs per cubic centimeter to 5,000 without working any hardship on the dairies at present receiving the Commission's certificates. After several years' experience it was found that the proteid percentage showed such insignificant variations that a monthly estimation was unnecessary, and it was abandoned, thus making it possible to have weekly bacterial counts instead of a single monthly count. This was of much greater help to the dairyman. The Commission originally certified to 4 per cent. fat milk, 5 per cent. fat milk and pasteurized milk, but this occasioned confusion and for several years the certificates have been limited to 4 per cent. milk and 16 per cent. cream. The veterinarian was usually charged with the duty of inquiring after the health of the workers at his monthly visit, but this was felt to be inadequate, and physicians residing near the dairies have now been appointed as medical inspectors. When any sickness occurs among the workers or their families, the superintendent of the dairy noti-

fies the medical inspector, who communicates with the physician in attendance and ascertains the nature of the disease, reporting to the Secretary of the Commission. In past years the Commissioners visited the dairies when the spirit moved them; now the Commission consists of ten members; attendance at each monthly meeting is required and a certain number of absences automatically erases a name from the list and a new member is appointed; each member is also assigned to a dairy each month and is expected to visit that dairy some time in the month and report as to its condition at the next meeting of the Commission. Some of the results of the work of the Commission during the past twelve years are that 2 per cent. of Philadelphia's milk supply is certified and that our example has been of help to many other Commissions which have been established over the country.

DR. ARTHUR NEWLIN said that, as Secretary of the Milk Commission, he had received verbal criticism from time to time of the products of the various dairies whose milk is certified by the Commission. The Commission invites criticism, but criticism given in this manner is of little value. They want facts, and facts in writing. During the past year he has received but one written communication concerning the milk. If a letter is received giving exact facts, with dates, this communication will be of inestimable value to the Commission, as the information can be followed up and if wrong conditions are found they can be corrected.

DR. LE BOUTILLIER said that, for unknown reasons, the greater portion of the physicians of this city know so little about certified milk that they apparently do not believe in it or recommend it to their patients. There is no doubt that babies are saved from serious illness by its use, especially in the heat of the summer. It is most important that we physicians who know its value teach other physicians to realize the benefits to be secured by using certified milk.

DR. W. N. BRADLEY said that, while not bearing directly upon the certified milk question, there was one thing greatly needed—improved transportation facilities—which would insure the delivery of the milk very much earlier than now happens. It is usually three days old before reaching the consumer. To this end every effort should be made to secure from the rail-



road companies more coöperation, as, aside from contamination due to handling, milk will show an increasing number of bacteria in proportion to its age.

DR. S. MCC. HAMILL stated that, while certified milk might be delivered late, it was never three days old before reaching the consumer. The railroads began the use of refrigerator cars last year. Milk ought to be delivered in the afternoon of the day on which it reaches the city, not the morning of the next day, as is the Philadelphia custom.

DR. R. S. McCOMBS suggested that, as the best charitable action of which he could think, certified milk be procured and given to dispensary patients at low cost; thus the babies would get good milk and the good results achieved by this means would far outweigh the cost. In comparison with other charitable works the real good accomplished would be manifold.

DR. H. BROOKER MILLS spoke upon the necessity of teaching the medical students the value of certified milk and reported having spent one hour during the past session at the Medico-Chirurgical Hospital, explaining its advantages to students, urging its use by them in practice. He felt that perhaps we were being too enthusiastic over the various percentage methods of milk modification, causing us to lose sight of the many advantages of good, plain, clean whole milk.

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MAGNESIA DRESSING FOR SEVERE BURNS.—Dr. Ohleyer reports (*Aerzt. Rundsch.*) upon a case of a burn of the third degree which was healed in a short time by magnesia dressings. His method was as follows: Twice daily, morning and evening, the wound was covered fairly thickly with magnesium carbonate, and over this a double layer of gauze, upon which a layer of absorbent cotton was secured by means of a bandage, was applied with moderate pressure. On redressing, the portions of the dressing which adhered to the wounds were carefully removed with pads of absorbent cotton dipped in a 1:1000 solution of lysol. The author attributes the favorable result to the alkaline properties of the magnesia, which absorbs and neutralizes the acid of the muscle juices, and deprives the pus of its destructive action upon the skin.—*American Journal of Clinical Medicine.*



## CURRENT LITERATURE.

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### ABSTRACTS IN THIS NUMBER BY

DR. CHARLES E. FARR.	DR. WILLARD S. PARKER.
DR. JEROME S. LEOPOLD.	DR. RICHARD M. SMITH.
DR. WILLIAM LYON.	DR. S. W. THURBER.
DR. C. D. MARTINETTI.	DR. J. HERBERT YOUNG.

### DISEASES OF THE EAR, NOSE AND THROAT.

SIEBERT, E. G.: THE SUPERIOR MAXILLA: A DISCUSSION OF ITS PROPER DEVELOPMENT. (*Annals of Otology, Rhinology and Laryngology*, March, 1912, p. 145.)

The superior maxillæ are the largest, as well as the most important, bones of the face. Each enters into the formation of three cavities—the roof of the mouth, the floor and outer wall of the nose, and the floor of the orbit. They contain many canals for vessels and nerves and their maldevelopment has to do with distortion and obstruction in these canals as well as with the lack of proper size and shape of the larger cavities. The author lays special stress on this fact in its relation to reflex neuroses. The maxilla develops from four centers, *i.e.*, (1) that part lying internal to the infraorbital canal, including the floor of the orbit and the outer wall of the nasal fossæ and processes. (2) That part lying external to the infraorbital canal and malar process. (3) That part forming the palatal process posterior to Stenson's canal and its adjoining nasal wall. (4) That part forming the front of the alveolus. The third is the most important, as it produces the major part of the bone and is responsible for the nasal chambers. The face grows most rapidly during two periods—(a) from birth to the eighth year, and (b) from puberty to the twenty-first year. Probably the most important period in which to watch and correct maldevelopment is from the second to the fifth year. Any cause for mouth-breathing during this period should be corrected. Orthodontia is often necessary in those cases where the removal of adenoids and large tonsils does not give the relief expected because of a high palate or deflected septum in the narrow face.

The following conclusions are drawn:—

(1) Normal nasal respiration is only attained through proper lateral development of the maxillæ, *i.e.*, the palatal processes.

(2) This development is materially retarded by those factors which prevent nasal respiration.

(3) In this abnormal development the shape of these bones may be altered, thus affecting their relations to contiguous structures.

(4) In this changed relation and altered shape we have factors for changing the direction and lumen of the nerve canals, thereby making pressure on their contents and causing irritation and reflex phenomena.

(5) No child is too young from which to remove causes restricting nasal respiration.

(6) When abnormal development has occurred, readjustment of the maxillæ probably offers the best results we can look for.

S. W. THURBER.

GUTHRIE, THOMAS, M.A., M.B., B.C. CANTAB., F.R.C.S. ENG.: THE RECURRENCE OF ADENOIDS. (*The Lancet*, April 20, 1912.)

The author states that the danger of recurrence is not a valid argument against operation in any case needing such treatment. Incomplete removal is often called a recurrence and acute inflammations of the throat, especially in measles and pertussis, syphilis and nasal obstruction, favor recurrence, which is much more common under seven years of age. Our own observation of a fairly large number of cases seems to show that even small remnants of diseased tonsils are an important factor in the re-growth of adenoid tissue.

WILLIAM LYON.

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## PATHOLOGY.

INABA, I.: INOCULATION OF ANIMALS WITH THE BORDET-GENGOU BACILLUS OF WHOOPING-COUGH. (*Zeits. für Kinderhk.*, June 15, 1912.)

Inaba found the Bordet-Gengou bacillus in 78 out of 81 cases of whooping-cough. The author was able to cultivate the bacillus in 68 out of 77 cases. In 18 cases of respiratory disease other than whooping-cough the bacillus was not found. Inoculation experiments were tried on dogs with negative results. One Japanese ape (*macacus speciosus* F. cuv.), ten months of age,

after inoculation developed a typical case of whooping-cough. The incubation period was thirteen days, the catarrhal stage two days. The paroxysmal stage lasted from twenty-three to twenty-five days. The stage of decline lasted about eighteen to twenty days. The entire period of cough lasted about forty-two days, after which the ape seemed entirely well.

JEROME S. LEOPOLD.

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### SURGERY.

DRUMMOND, HAMILTON: INVERSION OF MECKEL'S DIVERTICULUM. (*Annals of Surgery*, March, 1912.)

Of the 6 cases reported by Drummond of Meckel's diverticulum, 4 were in children and 2 in young men. The diagnosis in each case was intussusception, the cause of the lesion being found at operation. Four of the 6 died shortly after the operation. In all 6 cases the whole of the diverticulum was inverted and there was an accompanying intussusception of the small intestine. This implies that the Meckel is free in the abdominal cavity, as, if adhesions were present, inversion could not take place. Various views are given as to the cause of the inversion, such as peristalsis of the diverticulum, negative pressure from the rapid flow of intestinal contents across the mouth of the diverticulum, and, lastly, the author's view, that the process is due to a chronic inflammatory lesion of the mucosa at the base of the diverticulum, resulting in swelling and prolapse of the mucous membrane into the bowel. The symptoms are exactly those of intussusception, pain, hemorrhage and obstipation. Abnormality at the umbilicus may aid in the diagnosis. CHARLES E. FARR.

GIBSON, C. L.: RUPTURE OF KIDNEY IN CHILDREN. (*New York State Journal of Medicine*, June, 1912.)

Gibson declares his belief that rupture of the kidney in children is more common than is generally thought, and that the injury is frequently a severe one, with more or less complete division of the organ. Shock and the other symptoms of rupture may be so slight as to be overlooked until too late. Operation is indicated, in the author's opinion, in all save the very mild and the very severe cases. In the latter, where the kidney injury is only a minor part of a generalized injury, operation

should be deferred unless urgent kidney symptoms arise. The mild cases, due to slight injuries, may be watched for a short time, but on any increase of symptoms should be immediately explored. When in doubt, operate. Operate if the anemia increases. Operate if there are complicating intraperitoneal injuries which would of themselves demand an exploration.

CHARLES E. FARR.

HAWES, JOHN B.: THE TREATMENT OF TUBERCULOUS ADENITIS WITH REPORT OF 56 CASES FROM THE TUBERCULIN DEPARTMENT OF THE MASSACHUSETTS GENERAL HOSPITAL AND FROM PRIVATE PRACTICE. (*Boston Medical and Surgical Journal*, January 18, 1912, p. 80.)

The author reports good results from the treatment of tuberculous adenitis by a department especially maintained for tuberculous patients and believes that success was in a great measure due to the attention paid to diet, hygiene and general condition of the patient rather than to the treatment of the glandular condition alone.

The routine physical examination on admission to the clinic invariably included an examination by the nose and throat department and by the dental department to discover any condition retarding improvement of general condition. Each patient was also interviewed by the social service department as to his social and financial condition, and in all cases where necessary visits were made to the homes to insure directions being properly carried out. In addition, weekly visits to the clinic were made for the close following of temperature, local and general condition.

The author states no conclusion as to the exact part played by tuberculin.

WILLARD S. PARKER.

SAYRE, R. H.: TREATMENT OF VOLKMANN'S ISCHEMIC PARALYSIS AND CONTRACTION BY METHOD OF ROBERT JONES. (*American Journal of Orthopedic Surgery*, May, 1912.)

Sayre contends that ischemic paralysis is the result of a myositis from deficient oxygen, due to pressure by splints and bandages, or sometimes to faulty position of the bone fragments. The muscles of the forearm and hand, the ones most often affected, become much shortened and quite hard, with marked loss of function. The treatment is tedious and difficult.



Massage helps but little. The operation of shortening the bones by resection, together with freeing the nerves from pressure by scar tissue, is fairly successful. The author speaks very highly of the Jones method of continuous traction on contracted muscles. The constant force is far superior to the intermittent force of massage. Patience, however, is needed and further stretchings may be required, if, as sometimes happens, the bone grows faster than the muscles, with recurrence of deformity.

CHARLES E. FARR.

CACKOVIC, M. V.: GASTRIC ULCER IN CHILDREN AND ITS CONSEQUENCES (ULCUS VENTRICULI IM KINDESALTER UND SEINE FOLGEN). (*Archiv. für klin. Chirurg.*, June, 1912.)

Of the 172 operative cases of gastric ulcer at Zagreb, 2.32 per cent. were under ten years of age, while 7.55 per cent. were under fifteen. Cackovic believes that even this estimate is too low, as the lesion must have been present in childhood in at least some of the others, the symptoms not being recognized until later. The diagnosis is not easy in children, as the pain is apt to be misinterpreted, and slight hemorrhages are quite likely to be overlooked. In 13 of the cases, while symptoms had been present since childhood, the operation was not performed until several years later. All the patients recovered except 2.

CHARLES E. FARR.

PEISER, J.: PHIMOSIS AND HYDROCELE IN INFANTS (PHIMOSE UND HYDROCELE IM SÄUGLINGESALTE). (*Berlin. klin. Woch.*, June 3, 1912.)

Peiser regards phimosis as a more or less physiologic condition in young infants, which will correct itself later on. The symptoms usually attributed to phimosis the author believes are due to pelvic congestion from constipation. The urinary disturbances are neuromuscular in origin, reflex from the rectum. As for hydrocele, Peiser thinks operations unnecessary, as most of them will subside of themselves. The figures quoted, however, do not quite bear him out in this, as only 34 of his 73 cases were normal at the end of two years. These views on phimosis and hydrocele will not, probably, find ready acceptance, but they are surely of great interest, even if one does not agree with them.

CHARLES E. FARR.

## MEDICINE.

GÉNEVRIER, JOSEPH: PYLORIC DISEASE IN THE NURSING INFANT. (*Rev. d' Hyg. et de Méd. Infant*, 1911, No. 3.)

Under the name of pyloric disease the author wishes to group those symptoms elicited by spasm of the pylorus be it accompanied or not by hypertrophic pyloric stenosis. This would not include that series of cases in which stenosis is congenital. In the disease studied by G  nevrier commences between the second and third week of life with the following symptoms: Spasmodic vomiting following nursings, scarcity of defecations, scant urine and rapidly progressing lowering of temperature. The abdomen shows a marked depression in its lower half that contrasts with a dilated portion higher up. Treatment should tend to restore the infant to normal conditions, replacing losses of water and heat and feeding upon food concentrated as much as possible—modified milk, gruels, malted milk preparations, giving half ounce doses every hour and a half. Against the spasm small doses of 1:1,000 solutions of atropin, giving up to a maximum of  $\frac{4}{10}$  of a milligram (gr. 0.0004) in the twenty-four hours.

C. D. MARTINETTI.

PISEK, GODFREY R., M.D., AND PEASE, M. C., M.D.: ANAPHYLAXIS IN ITS RELATION TO PEDIATRIC PRACTICE. (*The Boston Medical and Surgical Journal*, January 25th, 1912, p. 127.)

Questions of anaphylaxis and immunity are closely associated, and a better knowledge of the one will lead to prognosis in the latter.

Anaphylaxis may explain sudden death of children of eclamptic mothers after the first copious nursing; Dr. Goodall, of McGill University, having reported 3 such cases. Anaphylactic shock can be produced in guinea pigs by first sensitizing to placental extract or to milk.

These facts seem to satisfactorily explain the cause of death in Dr. Goodall's cases. The factors so fatally important in these cases probably play a more or less important part in the feeding problems of childhood, especially in regard to idiosyncrasy as to some particular food as egg albumen, strawberries, buckwheat and other common foods. The inability to sensitize an animal to its own proteid may explain why breast milk is the only means

of saving certain atrophic babies, no modification of cow's milk having proved of value.

The incubation period of serum sickness has been demonstrated as from seven to ten days, and it is of interest to note that infants do well on almost any milk modification for a week or ten days and then have trouble.

Many diseases of children find satisfactory explanation in some degree of anaphylaxis; examples are hay fever, bronchial asthma, urticaria, angio-neurotic edema, tetany and laryngeal spasm.

The suddenness of onset and rapidity of disappearance make it seem certain that they are examples of anaphylaxis rather than results of unstable nervous equilibrium. The nephritis of scarlet coming on usually in the third week may be looked upon as a relapse caused by insufficient formation of antibodies to destroy all the bacteria and their growth in numbers produces sufficient anaphylatoxin to cause a relapse which is local in character.

WILLIAM LYON.

FIGORE, GENNARO: CRANIAL PERCUSSION IN INFANTS. (*Riv. di Clin. Ped.*, January, 1912.)

The author holds that percussion of the cranium should be a routine practice in the examination of all infants. The sound elicited is of varied character, may even resemble a cracked earthen pot. Various sounds may be restricted to special areas, and are in direct connection with the factor of intracranial pressure. Sounds may be modified by the character of the sublying bony structure. Cranial percussion is an aid to diagnose tubercular and purulent meningitis, hydrocephalus and other abnormal increases of tension.

C. D. MARTINETTI.

LUCAS, WM. P., AND SOUTHIARD, E. E.: CONTRIBUTIONS TO THE NEUROLOGY OF THE CHILD. (I) CONVULSIVE TENDENCIES DURING AND AFTER ENCEPHALITIS IN CHILDREN. (*Boston Medical and Surgical Journal*, February 29, 1912.)

Chiefly in the effort to determine the relation between acute encephalitis in children and subsequent epilepsy the authors investigated 12 cases treated at the Boston Children's Hospital, in which the diagnosis seemed certain. The number is small, as the diagnosis has been definitely made only comparatively recently.

All the cases showed sudden onset, paralysis or paresis (oculomotor in 7); deep reflexes altered, and mental symptoms in 10; rigidity of neck in 9; general convulsions in 7.

*Results.*—(1) Death in acute attack, 2 cases. (2) Recovery from acute attack, subsequent epilepsy and mental deficiency, and death after twenty-one months, 1 case. (3) Recovery from acute attack with residual symptoms, 5 cases; 2 remained normal except for strabismus and possible slight mental change; 2 epileptic and mentally defective; in these last a short interval occurred between recovery from the acute attack and the onset of epilepsy. One of these is slowly improving.

WILLARD S. PARKER.

MCKENZIE, ROLAND C.: ON THE PREVENTION OF OPHTHALMIA NEONATORUM. (*Boston Medical and Surgical Journal*, May 16, 1912, p. 737.)

McKenzie reports 388 cases of ophthalmia neonatorum admitted to the Massachusetts Charitable Eye and Ear Infirmary in four years; 23 were discharged totally blind and 42 partially so. Three hundred and sixty-eight were attended at birth by private or hospital physicians, 10 by midwives. Of the 65 who became partly or totally blind, 55 occurred in private practice and represented over 20 per cent. of the total number attended by private physicians.

These few figures leave no doubt as to where the responsibility rests in a large majority of cases of ophthalmia neonatorum. As a remedy the author urges the well-known procedure of Credé, which in Credé's clinic reduced the incidence of the disease from 20 per cent. to 0.2 per cent.

WILLARD S. PARKER.

HESS, ALFRED F.: A STUDY OF ICTERUS NEONATORUM BY MEANS OF THE DUODENAL CATHETER. (*American Journal of Diseases of Children*, May, 1912, p. 304.)

The author reviews the various theories as to the causation of icterus neonatorum and then reports an investigative study of the disease by means of the duodenal catheter. The test was carried out generally in two stages. A catheter was passed into the duodenum and after ten minutes withdrawn and then washed out and reintroduced for the same length of time. In 52 nor-



mal babies, almost all under six months old, bile was obtained but once, and in that instance in a small quantity in an infant two and a half hours old. It may further be stated that in the first half day of life there is rarely an excretion of bile into the intestine. Nineteen tests were made on infants twelve to thirty-six hours old. It was found that where marked jaundice was present, in 4 cases, bile could be obtained, but that where it was absent, in 14 cases, bile was also absent. As the infants increased in age bile was found in increasing frequency, but never to the same extent as in deeply jaundiced children.

Twenty-four cases were studied to determine the relation of bile excretion to jaundice. Bile was not obtained in any case previous to the appearance of jaundice. Even when the bile was obtained within the first twenty-four hours a marked early jaundice manifested itself. The quantity of bile excreted, however, played no important rôle, but in general there is marked secretion of bile when the jaundice is marked. The occurrence of jaundice depends upon a defective condition of excretion and secretion and is generally caused by the inability of the rudimentary excretion to dispose of the profuse secretion of bile.

RICHARD M. SMITH.

HOWLAND, JOHN, AND HOOBLER, B. R.: THE EFFECT OF COLD FRESH AIR ON THE BLOOD PRESSURE IN PNEUMONIA OF CHILDREN. (*American Journal of Diseases of Children*, May, 1912, p. 294.)

The authors report observations with blood pressure of infants and children ill with pneumonia. Cold fresh air always produces a rise in blood pressure and the removal to a warm, well-ventilated ward produces a fall in blood pressure. The rise is not apparent until half an hour or more after the children are out of doors. It does not reach its maximum for about two hours. The effect is continuous as long as thirty hours. There is no tendency of the pressure to fall as if from exhaustion. On removing the patient to warm, fresh air the fall is apparent in from fifteen to twenty minutes and reaches its lowest point in one hour. In convalescent patients the results are much less striking. The usual rise due to cold air is from 10 to 15 mm. of mercury. The favorable effect could not be produced when the children were simply put outdoors in warm weather, therefore it would seem that the cold was the im-

portant factor. The authors believe that the influence on the blood pressure is produced by a reflex stimulant of the vasomotor center by the action of cold air upon the skin of the face and on the nasal mucous membrane. RICHARD M. SMITH.

KING, GEORGE: OBSERVATIONS ON THE INTENSITY OF ACIDITY OF THE URINE IN CHILDREN. (*Boston Medical and Surgical Journal*, May 9, 1912.)

The author made his investigations on the intensity of acidity of urine by the method of Prof. L. T. Henderson, which determines the concentration of hydrogen ions with neutrality as a unit. Seventy cases were investigated.

A normal acidity, or  $2\frac{1}{2}$  times the hydrogen ion concentration of neutrality, was found in normal children and those having chronic diseases. Slightly increased acidity, five to twenty-five times the hydrogen ion concentration of neutrality, was found in children having enlarged tonsils, chronic intestinal indigestion, secondary anemia and epilepsy. Intensely acid urines, showing twenty-five to seventy-five times the hydrogen ion concentration of neutrality, were found in acute infections such as nephritis, endocarditis and bronchitis; very high acidity also existed in enuresis.

In the enuresis group the intense acidity was the only abnormality of any kind found. They were all given potassium citrate, gr. iii-viii, 4 i. d.; all cases showed improvement but one. The best results were obtained when the dosage of potassium citrate was so regulated as to keep the urine at normal acidity, or about neutrality. WILLARD S. PARKER.

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### THERAPEUTICS.

RIDDELL, JAMES R.: THE TREATMENT OF RINGWORM OF THE SCALP. (*The Glasgow Medical Journal*, February, 1912, p. 118.)

The treatment, according to most authorities, is a very slow process, and the difficulty in having it efficiently carried out makes cure uncertain and relapses frequent. Topical applications are inefficient because they do not penetrate deeply into the hair roots. What previously took many months, and sometimes years, to accomplish can now be done with certainty in a few

weeks by the X-ray. The only drawback to the X-ray is that at times it causes permanent alopecia, no matter how carefully the treatment has been carried out. Permanent alopecia is produced in from 2 to 13 per cent. of cases treated by the X-ray.

Riddell used the *ionic* method of applying antiseptics. This method carries the drug into the hair roots and does not cause alopecia. The appliances necessary are a small switchboard and electrodes. The procedure is as follows: The child's hair is shaved and a solution of the drug to be used is rubbed into the affected parts. Folds of lint are soaked in the solution and over the lint the electrode is placed. One pole of the supply is attached to the electrode and the other to a water-bath, in which the child's arm is immersed. The current is then turned on. Each sitting lasts about forty-five minutes. The solutions used are a 1 per cent. solution of mercuric chloride or a 1 per cent. watery solution of iodine. The treatment should be repeated two to three times a week. The average number of sittings in 53 cases treated by this method was 13. All these cases were cured. In favor of the X-ray, Riddell says that only one, two or three visits are necessary and that failure to cure is almost unknown, but the great disadvantage is the danger of alopecia. The *ionic* treatment is absolutely safe, alopecia never results and it is so simple that it can be carried out by the family physician.

JEROME S. LEOPOLD.

FLEXNER, SIMON: THE SPECIFIC TREATMENT OF INFECTIONS, WITH ESPECIAL REFERENCE TO EPIDEMIC MENINGITIS. (*Edinburgh Medical Journal*, May, 1912, p. 389.)

One thousand three hundred cases of epidemic meningitis treated with Flexner's antimeningitis serum are subjected to analysis. Including patients of all ages and in varying stages of the disease the mortality was 30 per cent. In 199 cases in which serum was injected within the first three days of illness the mortality was 18 per cent.; 346 injected from the fourth to seventh day, mortality 27 per cent.; 666 injected later than the seventh day, mortality 36 per cent. Of 125 infants below one year of age, 63 cases recovered and 62 died. There were 21 infants injected within the first seven days of illness, with 17 recoveries and 4 deaths. There were 5 infants injected within the first three days of illness; all recovered. There were 104



cases which came under the treatment at some period later than the seventh day, among which 46 recovered. The age period between two and five years appears to be more favorable to recovery; 201 cases in this age period showed a mortality of 15 per cent.; when injected before the seventh day the mortality was 10 per cent.; when injected after the seventh day, 20 per cent. In 263 cases over twenty years of age the mortality was 39 per cent.

The average duration of the disease in cases that recover was eleven days in serum-treated patients, and four weeks in patients treated without serum. Thirty per cent. of the cases terminate by crisis. Although three times as many persons now recover from the disease as did formerly, the number of permanent sequels among the serum-treated cases is small. Deafness, either partial or complete, has been the one serious complication noted. Blindness, paralysis and impaired mentality have either not occurred at all or so rarely as to be negligible as factors.

J. HERBERT YOUNG.

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#### INFANT FEEDING.

SCHLOSS, OSCAR M.: A CASE OF ALLERGY TO COMMON FOODS. (*American Journal of Diseases of Children*, June, 1912, p. 341.)

The author reports a case showing marked idiosyncrasy toward eggs, almonds and oats in a child eight years old and then discusses the general subject of allergy as related to food stuffs. He was able to produce cutaneous lesions at will by the inoculation of egg albumen. The technique usually employed by von Pirquet inoculation appeared five to fifteen minutes after the test was made. The intensity of the action varied with the strength of the dilution. Control experiments showed that the action was specific. Experiments were then undertaken to determine the nature and properties of the toxic substance in the egg white and resulted in showing that the toxic action was due to protein substances or some substance intimately connected with them. Five different proteins were separated. Two of these were incapable of producing the reaction and the other three showed distinct variations in toxicity. Proteins in egg yolk were also found to be toxic, but in a much less degree. Ex-



periments were undertaken next with ground almonds, and here again the toxic agent was shown to belong to the protein group. Several proteids were isolated and found to vary in toxicity as in egg white protein. Experiments with oats showed similar results as those from egg and almonds. Certain other food stuffs were investigated and some of them showed a positive skin test, indicating that the reaction is only relatively specific and may be caused by substances related to eggs, almonds and oats. Among the substances giving positive reactions were the serum of chicken, turkey, goose and duck, rice, barley and rye, bananas and kernels from certain fruits, as prunes and apple seeds. Isolated proteins were then studied as to the effect of heat dialysis, precipitation with ammonium sulphate and alkaloid reagents, also the absorptive properties and the effect of cryptic digestion. These experiments demonstrated that the substances responsible for the cutaneous reaction had the general properties of protein. It was found also that the patient's blood serum contained a substance which was capable of sensitizing guinea pigs to ovomucoid proteins. From this the author concludes that the allergic condition of the patient was due to protein sensitization or anaphylaxis. It was possible by feeding increasing doses of ovomucoid in capsules to raise the immunity of the patient so that he was able at the end to eat eggs without manifesting any untoward symptoms. At the same time immunity to oatmeal and a decreased susceptibility to almonds occurred.

RICHARD M. SMITH.

SCHORER, EDWIN H.: RECENT DEVELOPMENTS IN PASTEURIZATION OF MILK FOR A GENERAL MARKET. (*American Journal of Diseases of Children*, April, 1912, p. 241.)

The author concludes from extensive investigations that the methods of pasteurization which are employed in the laboratory and dairy are open to so many differences that the conclusions based upon the laboratory investigation cannot be depended upon for market milk. This is especially true of temperature where 140°F. for twenty minutes is sufficient in the laboratory, but is not safe in the dairy. The safest method of pasteurization is to allow at least thirty minutes for the temperature of pasteurization and then pasteurizing at 145°F. for thirty minutes more.

RICHARD M. SMITH.

## BOOK REVIEWS.

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HOME HYGIENE AND PREVENTION OF DISEASE. By NORMAN E. DITMAN, M.D. New York: Duffield & Company, 1912.

Dr. Ditman, in the Introduction to this really excellent book, disavows any attempt to supply a substitute for the doctor and warns the reader that any treatment that he may adopt from its pages will be adopted at his own risk. "Prevention of disease" and the "early recognition of disease" are the keynotes of the whole work. It is impossible to give in any detail the contents, which are arranged alphabetically and present a wide range of subjects. The writer of the book has undoubtedly had an English training and in many respects one feels that it is written for an English audience, as the diction contains many expressions which fall strangely upon American ears and many remedies are recommended with which we are less familiar. However, the advice is quite generally sound and especially is the section on alcohol to be recommended.

OUR BABY: A CONCISE AND PRACTICAL GUIDE FOR THE USE OF MOTHERS IN THE CARE AND FEEDING OF INFANTS AND YOUNG CHILDREN. By RALPH OAKLEY CLOCK, PH.B., M.S., M.D., Assistant Physician to the Out-Patient Department of the Babies' Hospital of the City of New York and St. Mary's Free Hospital for Children, New York City, etc., etc. Illustrated by the author. New York and London: D. Appleton & Company, 1912.

Here is another of the rapidly growing list of mothers' guides—with a difference. Dr. Clock's book is almost exclusively a treatise on hygiene and care of a healthy baby and deals very little with illness, being satisfied to indicate when a doctor should be called. It therefore will need a supplement for the mother who is away from medical aid and wishes to rely upon a book entirely, but it thereby avoids the greatest evil of books of this type, the encouragement to amateur doctoring and putting off—sometimes until too late—the physician's curative skill. Dr. Clock's introduction is a model of its kind. Of course, no other pediatricist will agree entirely with him in all his rules, because no two men see alike, and a great many things for babies can be well done several ways. It is refreshing to see someone come out flatly for discarding that flannel abomination called a belly-

band and give such good reasons for using a knitted one. However, there still appears the warning against "stork pants," which seems to be traditionally given by the doctors and widely disregarded with the best results by many mothers. Dr. Clock's advice about training and habits, if a bit academic, is yet sound and subject only to the criticism that it is easier to preach than to practice. With notable restraint he avoids initiating his readers into the mysteries of still another system of artificial feeding and recommends a physician's advice. "The Country in Summer" is a little section which contains much truth that all mothers should consider. The little book—not so little either—has considerable repetition, but seems all the more easily used on that account. It will undoubtedly be welcomed upon the nursery bookshelf to occupy a useful place with some of its older brothers.

THE CARE OF THE SKIN AND HAIR. By WILLIAM ALLEN PUSEY, A.M., M.D., Professor of Dermatology in the University of Illinois. New York and London: D. Appleton & Company, 1912.

This is a carefully written treatise on the hygiene of the skin for popular use. It is attractive in form and pleasing in the moderation with which it advises medication and its freedom from "fads." An excellent index is appended.

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PURPURA IN INFECTIVE DIARRHEA.—H. D. Rolleston and T. B. Molony (*British Journal of Children's Diseases*, January, 1912, p. 1) have found, among 100 cases of severe infective diarrhea, purpura present in 11 children. All but 2 of the cases were under eleven months of age, and in all there was a fatal issue. The rash occurred on the trunk, and, in contradistinction to ordinary purpura was not present on the extremities. The presence of purpura apparently bore no relation to treatment by infusion or the administration of serum. The authors conclude from the analysis of these 100 cases: (1) Symptomatic purpura in infective diarrhea mainly occurs on the abdomen and chest of infants under the age of one year. (2) It is usually a terminal phenomenon in prolonged cases. (3) The prognosis in these cases is extremely grave.—*Universal Medical Record*.

# ARCHIVES OF PEDIATRICS

SEPTEMBER, 1912.

ROYAL STORRS HAYNES, PH.B. M.D.,

EDITOR.

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## EDITORIAL.

### SEED FALLEN AMONG THORNS.

Guy de Maupassant, whose versatile mind comprehended the manifold angles of life and produced wonderfully accurate pictures of sexual psychology, both worthy and unworthy, struck in his short story, "Fecundity," a note which deserves wider hearing than the general character of his other stories usually allows.

Two men, one a senator, one a member of the Academy, are walking under the blossoming trees and, observing the yearly miracle of springtime, comment on the wonderful way in which the minute particles of the pollen are wafted by the breeze, sometimes for miles, to fertilize some other blooms and produce new trees, thousands of them perhaps. The absolute irresponsibility of the father tree strikes the attention of one man, and he com-



ments on the fact that the tree knows nothing of the fate of his offspring. This leads naturally to the situation obtaining among human beings, at least among the countrymen of de Maupassant, of whom he was writing, and one of the two is made to say:

"From eighteen to forty, perhaps, bringing into line all our passing encounters and contacts of an hour, it can easily be admitted that we have had intimate relations with 200 or 300 women. Ah! well, my friend, among this number are you sure that you have not made fruitful at least one, and that you have not upon the streets, or in prison, some blackguard son, who robs and assassinates honest people, that is to say, people like us? or perhaps a daughter in some bad place? or perhaps, if she chanced to be abandoned by her mother, a cook in somebody's kitchen?

"Robber, rover, all these miserable creatures in short, are our children. And how much better for us that is than if we were theirs, *for they reproduce, also, the beggars!*"

Then one tells an episode in his life when he was a gay, young man of twenty-five. Two friends go on a walking trip through Brittany; one friend comes down with an obscure fever which necessitates a stop in a remote country inn; there they find a comely servant maid who one night suddenly becomes the object and, unwillingly, the satisfier of the narrator's passion. A departure ensues in course, and forgetfulness of inn and maid, until, after many years, the same town is revisited and remembrances awaken. The servant maid is found to have died in childbirth, and the child, of an unknown father, has been brought up by the innkeeper. The time of his birth coincides with what should have been the birthday of a child of whom the Parisian might have been the father, and he is confronted by the awful realization that he has been the cause of the death of the girl and of bringing into the world the boy. He is an imbecile, a foul, vicious, lustful animal, in whom, nevertheless, the father finds resemblance to himself. So for years he re-

turns each year to see and to be near this low, unhuman being toward whom he feels an unutterable loathing, but toward whom he is drawn, nevertheless, by an irresistible feeling of parenthood.

A gruesome tale, the telling of which to an American audience would be met with a cry of dismay and the asseveration that American men are not so dissolute as this, and that the tale is overdrawn, the product of a mind whose acquaintance with the dark and the obscene has conjured up false horrors.

And yet, the exclamation of the French senator as he gazed at the blossoming tree was not without truth even for our civilization. Our youth may not—we hope *does* not—have the wide amatory experience he indicates; but the possibility that any one of “the chance contacts of an hour” may bring forth a beggar, a thief, a prostitute, an imbecile, is as great in actual life as in the tale. And “*they reproduce, also, the beggars!*”

Let us consider from this point of view the case of a family, an American family reaching back to Colonial times, whose history has been very fully investigated and is described in a very wonderful and absorbing book.\*

This Kallikak family (the name is, of course, fictitious) has consisted of two branches since Revolutionary days, the legitimate and the illegitimate, or the normal and the feeble-minded one—however we choose to consider them. Both had their origin from a single individual on the male side. At the beginning of the Revolution, Martin Kallikak, a youth of good family, a bit wild, going to the war, met at a tavern a feeble-minded girl of unknown name and heredity, and became by her the father of a feeble-minded boy. Returning from the war, he reformed and married a woman of his own class, of sound heredity, and with her started the normal side of the family. This branch in five generations has numbered 496 persons, who have all been normal people, respectable members of the community,

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\* “The Kallikak Family: A Study in the Heredity of Feeble-Mindedness,” by Henry Herbert Goddard, Ph.D., Director of the Research Laboratory of the Training School at Vineland, N. J., for Feeble-Minded Girls and Boys, (The Macmillan Co., New York, 1912.)

doctors, lawyers, judges, educators. They have married into good families and have been prominent in whatever community they have entered. There have been no feeble-minded among them; no illegitimate children; no immoral women; only one man who was somewhat loose sexually. While the appetite for strong drink has been noted among them, only two of all the number have been habitual drinkers. On the whole, a normal, healthy, high-minded collection of people, typical of the best traditions of Colonial stock, an index of the capabilities of Martin Kallikak's family.

Of the illegitimate, the feeble-minded side, there have been 480 descendants in five generations. Only forty-six of these have been normal mentally. One hundred and forty-three have been definitely feeble-minded, and the rest possibly so. Among the 480, thirty-six have been illegitimate; thirty-three have been sexually immoral; twenty-four have been confirmed alcoholics; eighty-two have died in infancy; three were criminal; eight kept houses of ill fame. They have occasionally married normal persons, but usually into families of about the same type, so that they have increased their degeneracy and have been a burden to the community, often living helpless in squalor and filth, the prey of anyone who cared to use them for any base purpose, a hopeless, helpless, economically impossible group.

Could the mind of de Maupassant conjure up a picture more terrible than this actual demonstration of the theme of "Fecundity" carried out to the third and fourth generation and beyond? Would his Parisian have spoken so cynically, "They reproduce, also, the beggars!" if he could have seen what an infamous crew of criminals, prostitutes and drunkards might be coming into the world through his agency, touched into life by his short-lived passion for a servant-maid? What must the soul of Martin Kallikak feel if, from afar off, it contemplates what he initiated as a boy in the Revolutionary army? What may not our own youth gain by a consideration of this story?

There are many other questions brought up by this study of

the Kallikak family than this one of moral responsibility. As a study of the psychology of the feeble-minded and the heredity of feeble-mindedness it is remarkable. Look at Deborah, the child whose case initiated the investigation, one of the fifth generation from Martin Kallikak and that feeble-minded girl. Brought into the institution at Vineland when eight years old and since then under the most devoted care and careful training, never subject to the temptations that so often lead astray feeble-minded girls and fill our almshouses and reformatories, she is now a woman of twenty-two. "She is cheerful, . . . affectionate, willing, and tries. . . . Learns a new occupation quickly, but requires half an hour or twenty-four repetitions to learn four lines. . . . Can run an electric sewing machine and do practically everything about the house. . . . Does excellent work in wood-carving and is excellent in imitation. . . . Is a poor reader and poor at numbers." She is a typical instance of the high-grade imbecile. She has been most carefully trained and guarded, and yet practically nothing has been accomplished toward her mental development and self-control. Left to herself she would become the prey of anyone, simply because she could not resist and all her instincts are toward lower things.

Deborah is an answer to those who feel that environment will overcome any fault in heredity; and the whole family presents a remarkable experiment which has been worked out in the crucible of years and human lives, showing the influence of heredity and the validity of Mendel's laws. Far more space than we can give would be necessary to adequately cover all the aspects of this investigation which presents itself in such a living, appealing form.

It cannot but teach us to guard our feeble-minded, to instruct them as far as we can, hoping for much, content with a little gain; to investigate so-called criminals in order to determine in how far they are simply feeble-minded and irresponsible; to prevent by all means in our power marriage and childbirth in feeble-minded girls and women.



## ORIGINAL COMMUNICATIONS.

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### THE DEXTRINS AND MALTOSE IN INFANT FEEDING.\*

BY THOMAS S. SOUTHWORTH, M.D.,  
New York.

During the progress of pediatric research into the physiologic relations to the organism of the various elements of an infant's food, attention has recently converged upon the part played by the carbohydrates, both as destructive and constructive agencies. The importance of carbohydrates in furnishing to the normal body fuel for energy and heat requires no recapitulation. It is rather the injurious effects upon the human body of carbohydrate intolerance, and, during recovery from such conditions, the relative toleration and absorbability of the different saccharides that has most keenly gripped our attention.

In health, the infant has seemed to take with about equal facility the three sugars most commonly employed in making up the deficiency of carbohydrates in diluted cow's milk—namely, milk sugar, cane sugar, and so-called malt sugar—but it has remained for recent investigations of the pathology of nutrition to assign to each of these forms of sugar its relative position as a disturbing factor. Following the dictum that nothing should enter into the composition of an infant's food which did not appear in breast milk, it would have been natural to suppose that cane sugar and malt sugar, as extraneous substances, would be found to be the more deleterious. On the contrary, recent investigations have placed the chief stigma upon the lactose of cow's milk, even though present as a natural constituent of such milk.

In now rearranging the sugars in the order in which they are best borne after injury by the carbohydrates—namely, as malt sugar, cane sugar, and milk sugar—we seem to have overlooked previously the fact that so-called malt sugar has always been a common source of human nutriment when formed from the

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\* Read at the Annual Meeting of the American Pediatric Society, Hot Springs, Va., May 20-31, 1912.

starchy elements of the diet by the activities of the digestive ferments. Although the advantages of the so-called malt sugar, or maltose, have recently again received wide recognition for purposes of restoring deficient or halting nutrition in infants, and for furnishing sufficient calories during recovery from food injuries, there has been little appreciation of the rationale of its action.

At the outset of such an inquiry, it must be grasped that the terms malt sugar and maltose, as applied to the substances commonly employed in infant feeding, are inaccurate and misleading. While pure maltose in the strictly chemical sense is a rare product of the laboratory, too expensive for general use and consequently never employed in infant feeding, the commercial products to which this generic name is too often loosely applied, are numerous and it is doubtful whether any two of them have exactly the same composition. The term embraces almost any preparation produced by the action of diastasic ferments upon starch, but the result of such action by well-known chemical laws is never in practice pure maltose. Making all allowance for the divergences of experimental authorities, and independent of whether the active enzyme be the diastase of germinating grain or the animal enzymes, ptyalin or amylopsin, the result of such action upon starch is a mixture of the various dextrins with maltose. The composition of the resulting admixture is not a negligible one, as will be seen if we trace the various steps of its formation from raw starch.

The grains of raw starch, a polysaccharide, give a blue color when tested with iodine. When boiled, they swell, rupturing the cellulose envelope, taking up water in physical combination and forming a jelly. A small portion of this gelatinized starch, which is soluble in water and known as amylopectin, also gives with iodine the blue reaction of starch. The addition, however, to the mass of gelatinized starch of a small amount of one of the diastasic enzymes suffices to bring the water into chemical combination with the starch, the blue color is no longer evoked by iodine, and as the action of the enzyme progresses there is produced, together with maltose, an important group of dextrins. These dextrins, probably of different molecular weights, are, as is well known, erythropectin, giving a red color with iodine; achropectin, which is colorless, with iodine; and, finally, maltodextrin. Other intermediate stages have also been described.

Whether maltose is successively split off from the starch with each advancing step of the dextrin chain, or is the final product of that chain, is disputed. It suffices for our purpose that after the addition of the enzyme to the starch, both maltose and dextrins are present, whose proportions vary markedly with the conditions under which the transformation has taken place; and that pure maltose is never produced, because the presence of sufficient maltose inhibits the further evolution of the dextrins until the excess of maltose is removed.

We have, then, in the same mixture, maltose, which is a disaccharide and crystalloid, fermentable and dialyzable, and dextrins, which are polysaccharides, reversible protective colloids, non-fermentable and non-dialyzable. Surely such contrasting properties must have attracted the attention of those who employed them largely in infant feeding. We turn, however, in vain to much of the most important literature upon the practical use of malt preparations for such mention. In it we find surprisingly little interest in the dextrins. Many authors are still content to speak of maltose as though it were alone worthy of mention.

One is therefore forced to the conclusion that while the demands of science led to a subconscious formal recognition of the presence of dextrins, they were long treated in pediatric literature as negligible though unavoidable accompaniments of maltose, to the presence of which latter sugar in the various malt products was ascribed whatever virtue the combination might possess.

There is nothing essentially new in the use of maltose and dextrin in the human economy. It is as old as the digestion of starch. It was rendered practicable for infant feeding by von Liebig, and has survived in various forms since his death. Chapin employed it in dextrinizing gruels; Keller gave it a new impetus abroad in his malt-soup; and it is now considered by Finkelstein essential to the reclamation of the infant suffering from "dyspepsia, decomposition, and intoxication." It is but natural that while accepting the clinical testimony we should inquire why it should be so valuable, and to what properties it owes its present-day popularity. A perusal of the literature would indicate that its use has been urged chiefly because it is less fermentable and because more of it can be absorbed than of other sugars, such properties being ascribed usually to its component maltose. Let us see whether some clear statements

can be formulated which will be of service to the student of infant nutrition.

The carbohydrates, as a group, are carbon carriers furnishing fuel to the body for combustion by oxidation. The choice between them lies, then, chiefly in their suitability to the individual and the ease with which they are converted and absorbed without untoward by-effects. Clinical experience has fully demonstrated that either lactose, saccharose, or maltose-dextrins could be used successfully in feeding innumerable normal infants. The question of choice between them arises chiefly when disturbances of digestion occur during the administration of any one of the three. Starch, also, in moderate quantities, has been so largely employed in the food of infants that there is no longer any question of its utilization by the organism when transformed, of course, by the digestive processes into dextrin and maltose.

MILK SUGAR	CANE SUGAR	MALT SUGAR	
		Starch (Amylum)	Polysaccharides { <div>             Colloids              (reversible, protective)              Non-fermentable              Non-dialyzable           </div>
		Amylodextrin	
		Erythrodextrin	
		Achroodextrin	
		Maltodextrin	
Lactose	Saccharose	Maltose	Disaccharides { <div>             Crystalloids              Fermentable              Dialyzable           </div>
Dextrose + Galactose	Dextrose + Levulose	Dextrose + Dextrose	
			Monosaccharides

The accompanying table arranges the commonly employed carbohydrates with reference to their supposed molecular complexity, their chemical relations, and their properties. Attention should be directed to the fact that both starch and the dextrins are polysaccharides, while the end products into which the latter are finally split by the enzymes during digestion are monosaccharides. But while polysaccharides and disaccharides enter as such into some of the many mixtures used for infant feeding, these must be reduced to monosaccharides for normal absorption. Dextrose is recognized as the most suitable monosaccharide for this purpose, since galactose and levulose must undergo a further process of inversion to dextrose. It therefore would appear that maltose, which splits into two molecules of dextrose, may be absorbed with less labor than either lactose or saccharose.



Nevertheless, while lactose and saccharose are given in the food by themselves, maltose is never administered without an admixture of dextrins, which latter, while capable of being further elaborated into maltose, and subsequently into dextrose, have, for the time being, very different chemical and physical properties. This association, then, of the dextrins with maltose, instead of being a negligible matter, is a factor of considerable importance and may be assumed to play a large part in the favorable effects of the malt preparations in disturbed conditions.

It is now recognized that the ingestion at one time of large quantities of one of the sugars may produce diarrhea, and that this diarrhea results from irritation of the small intestine, either by the sugar itself or by the products of its fermentation. This increases peristalsis and hurries the contents through the intestine, allowing insufficient opportunity for proper elaboration and absorption. The irritation may, moreover, be sufficient to cause injury to the mucous membrane and exfoliation of its important epithelium. Now, the polysaccharide starch, if gelatinized, when combined with sugar, which would, if given alone, cause irritation of the intestine, is apparently capable of acting as a protection to the mucous membrane, either by preventing rapid absorption of the sugar or by a mechanical action similar to that of the familiar starch enema upon the lower bowel. Keller was forced to make use of this protective property of starch to enable him to employ larger quantities of his malt-soup extract than would otherwise be tolerated without disturbance.

Thin barley gruels, when substituted for a plain water diluent, have been found to be particularly helpful where disturbance of intestinal digestion has arisen during the use of milk and lactose or of milk and saccharose mixtures. It is therefore worth considering whether the advantages of barley gruel are due wholly to its effect upon the protein curd, and not also, in part at least, to this same protective property of gelatinized starch. Furthermore, we may find in the same principle an explanation of the empirical but successful use of cereal decoctions in the early stages of summer diarrhea, quite apart from the restraining effect of carbohydrates upon putrefactive bacteria and the known value of a carbohydrate diet in favoring a retention of fluids in the body tissues.

Such being the action of gelatinized starch, it is reasonable to assume that dextrin subserves a similar function, since it is

also a polysaccharide and closely related to gelatinized starch in its clinical and physical properties. This protective action of the dextrin is not, however, the sole advantage of the maltose-dextrin combination over the pure disaccharide sugars. The maltose-dextrin mixture, when given in equal or even in somewhat greater amounts than lactose or saccharose, offers for immediate absorption only a portion of its potential sugar. On the one hand, the moderate quantity of immediately available maltose does not so readily overtax the absorptive mechanism nor overwhelm the intestine or the organism with a flood of sugar; while, on the other hand, the reserve sugar in the form of dextrin, being non-dialyzable, does not readily pass through the intestinal wall but may be gradually transformed into maltose and absorbed as it is needed during the undisturbed progress of the chyme through the bowel. It is entirely conceivable that an excess of sugar in the intestine might easily prove too much for the orderly processes of the splitting enzymes, and lead to the absorption of unchanged sugar, which would throw a secondary strain upon the entire organism.

If, however, we accept the more modern view that while all carbohydrates are normally transformed into dextrose before absorption and stored in the liver as glycogen, all the sugar normally leaving that organ in the blood is in the form of maltose, the direct absorption of maltose from the gastrointestinal tract becomes a matter of much less serious moment than a similar absorption of unchanged lactose or saccharose. In fact, it seems exceedingly probable that one of the chief reasons for the prompt improvement often seen in the condition and the weight of exhausted marasmic infants when a malt-sugar preparation is substituted for one of the other sugars, is because some of the maltose is absorbed as such and furnishes an immediately available fund of energy for the not inconsiderable labor of digesting the rest of the meal.

Although malt preparations are spoken of as less fermentable than the other sugars, it is, of course, an error to think of maltose itself as not liable to fermentation of certain types, since this property of maltose is relied upon in all brewing operations. Nevertheless, the cleavage of maltose into two quickly absorbable molecules of dextrose may proceed so readily that less opportunity is afforded for attack by undesirable ferments. Dextrin, on the contrary, which remains unfermented in beer, is immune

to fermentation in the intestine until reduced to assimilable maltose, and in this manner the clinical experience with the maltose-dextrin combination is readily explained.

Having demonstrated that the presence of dextrins plays no small part in the therapeutic and nutritive values of maltose-dextrin preparations, our attention is directed to the proportion in which these are present in the commercial products:—

	Maltose %	Dextrin %
Soxhlet's Nahrzucker .....	52.44	41.21
Loeblund's Nahr maltose .....	40.00	60.00
Dextri-maltose (Mead-Johnson) ..	51.00	47.00
Neutral maltose (Maltzyme Co.) ..	63.-66.	8.-9.
Loeblund's malt-soup extract .....	58.91	15.42
Borchardt's malt-soup extract ....	57.57	15.76

It will be noted that the dry preparations contain 40 to 60 per cent. of dextrin and that the semi-fluid preparations contain 10 to 15 per cent. The latter, however, in making malt-soup are combined with gelatinized starch.

That the proportions vary is not surprising when one considers that the concentration and reaction of the solution, the temperature at which conversion takes place, and the length of time that the enzyme is allowed to act upon the grain or starch markedly influence the extent of the conversion into maltose and dextrin and determine which of the two shall preponderate.

Thus far, we have been accustomed to rely upon the clinical results obtainable by the use of one or other of the stereotyped commercial preparations of more or less fixed proportions. An exceedingly interesting field of research is now open for determining the nutritive and therapeutic values in normal and pathologic cases of high, average or low percentages of dextrin in maltose-dextrin mixtures. This would present no great difficulties, since temperatures below 55°C. (131°F.) produce the largest amount of maltose, and above 63°C. (145°F.) produce the dextrins in excess, until a temperature of 75°C. (167°F.) stops the action of the enzymes. There would, indeed, seem to be little excuse for always using the same proportions of maltose and dextrin, and a reasonable expectation that more favorable results might be obtained in selected cases by varying the proportions as we are wont to do with other constituents of the infant's food having diverse properties.



However, both milk and cane sugar have proved, in our hands, eminently satisfactory in so many normal cases that we need not feel called upon to yield hysterically to the temptation to employ the more expensive malt-products exclusively, yet any knowledge which we may acquire of the behavior of the different carbohydrates places their use upon a more scientific basis and must inevitably increase our resources for meeting promptly and efficiently deviations from normal digestive conditions.

807 Madison Avenue.

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WARFARE AGAINST DIPHTHERIA.—Prof. Dietrich, of the Institution for Contagious Diseases at Charlottenburg, discusses the severe epidemic of this affliction which visited Berlin some time ago. So severe a visitation had not been experienced for decades. The preventive measures in force for some years past are thus seen to be unable to cope with the disease at its worst. This is due to the fact that in earlier years our knowledge of the modes of transmission was defective. At present we know that sources of immediate contagion may practically be disregarded. The part played by the permanent carrier of germs has long been known, but exact details have been wanting. It has been thought that any one might be a chance carrier, and that the bacillus might be present in the throats of any class of people as a mere saprophyte. At present evidence points to the fact that a carrier of the sort to be feared is almost necessarily some one who has been in close proximity to an actual patient for a considerable period, and who does not himself contract the disease. In future all who have thus been exposed in a family should be followed up. Naturally, the actual patient becomes a carrier, too, but this fact has for many years been recognized and acted upon by quarantine. In children of school age the problem of the carrier is somewhat simplified by the custom of keeping sound children of the family out of school for a definite interval. The preventive injections of antitoxin are only partially effective in sterilizing carriers. During the present epidemic the local authorities were much encouraged by the fact that it has not become necessary thus far to close any of the public schools.—*Medical Record*,



## THE EMPLOYMENT OF SALVARSAN IN INFANTS AND YOUNG CHILDREN.\* †

BY L. E. LA FÉTRA, M.D.,

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If we consider only the moderate grades of congenital syphilis, the treatment of the disease by the older methods with the various preparations of mercury and iodid of potash has been quite satisfactory. When, however, we consider the severer types, particularly those showing a tendency to hemorrhage during the early days of life, and when, moreover, we contemplate the possibility of the appearance during the latter part of the first decade of the tardy manifestations of the disease, a feeling of dissatisfaction must come to us. On account of the high mortality of the serious cases, on account of the possibility of late manifestations of the disease in the eye, ear, bones or nervous system, there has long been needed, even in the management of lues in infants, some other more powerful and more certain remedy.

Moreover, since the introduction of the Wassermann reaction for the detection of the disease and also for determining that the disease has been checked, if not eradicated, there has been a still further incentive toward the use of other than the mercurial treatment. It was Ehrlich's hope that in "606," or salvarsan, he had obtained the great sterilizing agent which would by one administration, if in sufficient dosage, entirely destroy the spirochetæ and so rid the system of the disease and of its consequences.

The use of salvarsan in adults has been so general during the past two years that very definite conclusions have been reached in regard to technique and dosage. With regard to the use of salvarsan in infants, however, there is not as yet the same certainty in this respect.

The salvarsan may be administered to the infant indirectly

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\* Read at the Annual Meeting of the American Pediatric Society, Hot Springs, Va., May 31, 1912.

† From the Children's Wards of Bellevue Hospital, First Medical Division.

by injection of the pregnant or of the nursing mother, or it may be given directly to the infant.

According to the conclusions of De Buys<sup>1</sup> the results on the infant of injecting the pregnant woman with salvarsan have been generally unfavorable. He quotes Gluck as having injected a woman seven months pregnant with resulting death of the fetus on the following day.

Good results from injecting the nursing mother have been reported by Taege,<sup>2</sup> Duhot,<sup>3</sup> Malinowski,<sup>4</sup> Dobrovits,<sup>5</sup> Sequeira,<sup>6</sup> Marschalko,<sup>7</sup> and others. Negative results from the indirect method are reported by Peiser,<sup>8</sup> Rosenthal,<sup>9</sup> Ritter.<sup>10</sup> Oppenheim,<sup>11</sup> and Spiethoff<sup>12</sup> report negative results by the injection of the mother, with later good results after direct injection of the infants.

The best and most rapid results are obtained by the direct injection of salvarsan into the infant. The routes for injection have been the subcutaneous, the intramuscular and the intravenous. The subcutaneous injections produced bad sloughs or cellulitis and so were soon abandoned. The intramuscular (usually intragluteal) injection of a paraffin oil emulsion of salvarsan in dosage of 0.015 gram per kilogram is favored by Hochsinger<sup>13</sup> and others, while von Bokay<sup>14</sup> prefers Wechsèlmann's neutral suspension in dosage of 0.008 to 0.01 per kilogram. Von Bokay used this method in 26 cases, giving second injections in ten instances, and seems enthusiastic over the direct method, though the occurrence of three relapses leads him to the conclusion that the ideal procedure with salvarsan has not yet been determined.

Savariaud<sup>15</sup> reports a good result by direct treatment of a girl of four years suffering from bone lesions after mercurial treatment had been unavailing.

Among others who reported good results from the direct method are Escherich,<sup>16</sup> 6 cases; Lesser,<sup>17</sup> 9 cases, and Miekley,<sup>18</sup> 5 cases.

Toxic polyneuritis from the intragluteal injection of 0.3 gram in an eighteen months old girl has been reported by Fischer,<sup>19</sup> and parenchymatous nephritis along with necrosis of the subcutaneous fat, muscles, blood vessels and nerves has been reported by Merkel<sup>20</sup> as the result of the intragluteal injection of salvarsan in a two and one-half months infant.

Since June 30, 1911, there have been treated on my service

in the children's wards at Bellevue Hospital 25 cases of hereditary syphilis of the congenital type. Of these, 10 received salvarsan either with or without mercurial treatment, while 15 were treated by the use of mercurials alone. It should be said in explanation of the large number that did not receive salvarsan treatment, that some of these patients were in a moribund condition and died within two or three days after entering the hospital, even before a Wassermann reaction could be obtained; others were such mild cases that it seemed wise to use only mercury; while for still others there was objection on the part of the parents to the administration of the new remedy intravenously.

The ages of the 15 patients in whom only mercurial treatment was used ranged from three weeks to one year—the most of the patients being about three months old. The ages of the 10 salvarsan cases ranged from two months to five and one-half years.

The two sets of cases were treated in the wards side by side without selection, save that the moribund cases were not given salvarsan.

The symptoms of the infants and younger children were quite similar in the two groups of cases, with the exception that the one patient five and one-half years old receiving salvarsan had severe bone lesions.

The mercurial treatment consisted usually in the administration of gray powder  $\frac{1}{4}$  to  $\frac{1}{2}$  grain two or three times daily, together with inunctions of 25 per cent. blue ointment every second day. In some cases the salicylate of mercury was injected intramuscularly in doses of  $\frac{1}{10}$  of a grain every second day.

The technique of the salvarsan administration was as follows:—

Only freshly distilled water, heated up to 120°F., was used in making up the solution.

The contents of the ampulla of salvarsan, containing 0.6 gram of the drug, are poured into 100 c.c. of the hot water and then shaken thoroughly until dissolved. Four per cent. Na OH solution is then added cautiously until the fluid is clear. It usually takes about 0.7 c.c. of the 4 per cent. Na OH solution to each 0.1 gram of salvarsan, or about 4 to 4.5 c.c. of the Na OH solution to alkalize the 0.6 gram salvarsan in the ordinary ampulla. Then more hot distilled  $H_2O$  up to 300 c.c. Each 50 c.c. of this solution rep-

resents 0.1 gram, or each 5 c.c. represents 0.1 gram of salvarsan, which is convenient for dosage. The cloudiness often found in the salvarsan solution is filtered out through sterile gauze. Now the solution is ready for injection. It is most convenient to make use of an apparatus devised by Dr. Albert M. Meads, of Bellevue Hospital, New York, who has, since December, 1911, given 43 injections with it. This consists of two tall 300 c.c. vessels, one for the salvarsan solution and the other for salt solution, connected by tubes to a Y, from which passes the long tube carrying the needle for injection. Both vessels are connected at the top with a tube leading to a pressure bulb which can be used to hurry the liquids out of the vessels. When the patient's vein is ready, some 0.9 per cent. Na Cl solution is run through the long tube. Next, plunge in the needle and run in a little Na Cl solution, then turn stop cock and run in the desired amount of salvarsan solution. Then run in more Na Cl solution to force the salvarsan further into the general circulation, and out of the vein.

There is seldom any rise of temperature afterward, in most cases none at all. At times a rise of temperature the same day may be due to the mere excitement of the operation itself.

Because of the disastrous or unsatisfactory experiences of others, none of the salvarsan was given intramuscularly nor subcutaneously. It was always given intravenously and nearly always after having cut down and exposed a vein at the bend of the elbow. To plunge the needle through the skin and subcutaneous fat and into the vein is not easy in infants, since the vein slips away or else is pierced clear through. Recently it has been proposed to use the vein of the scalp, and no doubt this will simplify the administration in many cases.

The ages, the weight of the patients and the dosage employed were as follows:—

Case 1,	2	mos.	Weight, 9 lbs., or about 4½ kg.	Dose, 0.05 gram
Case 2,	9	mos.	Weight, 7-8 lbs., or about 3½ kg.	Dose, 0.05 gram
Case 3,	3	yrs.	Weight, 25 lbs., or about 12 kg.	Dose, 0.10 gram
Case 4,	2	yrs.	Weight, 23 lbs., or about 11½ kg.	Dose, 0.10 gram
Case 5,	2	yrs.	Weight, 23 lbs., or about 11½ kg.	Dose, 0.08 gram
Case 6,	3	mos.	Weight, 9 lbs., or about 4½ kg.	Dose, 0.05 gram
			on October 12th, and second dose, December 18th,	0.05 gram
Case 7,	5½	yrs.	Weight, 27 lbs., or about 13 kg.	Dose, 0.10 gram
			on October 22d; second dose, January 7th, 1912,	0.10 gram
Case 8,	17	mos.	Weight, 17 lbs., or about 8 kg.	Dose, 0.10 gram
Case 9,	2	mos.	Weight, 8 lbs., or about 4 kg.	Dose, 0.10 gram
Case 10,	11	mos.	Weight, 9 lbs., or about 4½ kg.	Dose, 0.10 gram

These last two doses were nearly double the proportions used before.



*Reaction to the Intravenous Injection.*—As regards local or general reaction from the intravenous injection, there was never any necrosis or inflammation at the site of venipuncture, and the febrile reaction spoken of by many authors was seen only three times, even then being very mild, a rise on same day to 103°F. in 1 case and up to 101° or 102° F. in 2 cases on the second or third day after injection. The absence of febrile reaction is thought to be due to the use of freshly distilled water for making up the solution.

In 1 case in which there had been an irregular fever up to 102½°F. before the injection, the temperature gradually came down to normal after injection, coincidently with the disappearance of the snuffles and the fading of the maculopapular eruption.

The results of the 15 cases treated by mercurials alone were as follows: Three improved, 2 unimproved and 10 died. The 10 cases treated by salvarsan showed a mortality of only 2; all the other cases were decidedly improved and several showed marked gain in weight and improvement in general condition in addition to the disappearance of their specific symptoms.

One child two years old gained 5 pounds in weight in two and one-half months, though the Wassermann remained positive until time of discharge from the hospital.

The five and one-half-year-old child gained in weight from 27 to 36 pounds during her six months' stay in the hospital, having had two salvarsan injections and later protoiodid of mercury pushed to the limit of tolerance. Another child, seventeen months old, gained nearly a pound in her short sojourn of nine days in the hospital.

The detailed record of the five and one-half-year-old child seems worth reporting, since it showed a relapse of symptoms while under observation and most marked improvement by the employment of both salvarsan and mercurial treatment.

Jeannette K. Five and one-half years old. Admitted October 12, 1911. Discharged improved April 9, 1912.

*Family history* of 2 still-births and of 2 other children dead of convulsions.

Previous personal history not obtainable further than that the child had suffered from painful swollen wrists and joints for some months. Both wrists were swollen, together with the bones

just above the wrist, and on the right side there was a tender fluctuating swelling.

Saddle nose, enlarged spleen, liver and lymph nodes, together with some swelling of the bones of legs completed the picture of late hereditary lues.

The photograph taken November 1st shows fairly well the surface appearance of the forearms. (Fig. 1.)



FIG. 1.—Photograph showing saddle nose and marked swelling of radius and ulna of left forearm.

X-ray pictures taken two days after admission showed characteristic bone changes—subperiosteal infiltration with osteoporosis especially marked at the lower ends of the greatly thickened ulna and radius. (Figs. 2 and 3.)

On October 15th, three days after admission, the Wassermann reaction was found to be positive, though only weakly so.

On October 22d, 0.10 gram salvarsan was given intravenously, and that same night there was a temperature reaction up to 103°F. This lasted only a few hours, and on the following day the temperature was normal. The tenderness and swelling in the forearms improved rapidly, but on December 5th the X-ray showed that there had been only slight improvement in the condition of the bones.

On December 11th the Wassermann test was still positive.

On January 5, 1912, on account of a very definite relapse of the forearms to a condition almost as bad as upon admission to the hospital, a second injection of salvarsan was given—the same amount as at first, 0.10 gram, was injected intravenously.

This time there was absolutely *no* temperature reaction. Now in addition to the salvarsan there was given for a few days before the second salvarsan injection protoiodid of mercury,  $\frac{1}{10}$  grain *t.i.d.*, later increased to  $\frac{1}{5}$  grain *t.i.d.* This was continued until mild symptoms of salivation showed themselves, about March 23d.

The improvement after the second injection, and coincident with the administration of protoiodid was rapid and continuous, so that the bones of forearms and legs became normal to ordinary physical examination. The Wassermann reaction became negative and was still negative on May 20th. Unfortunately, the child was removed from the hospital unexpectedly, so that I am unable to exhibit X-ray pictures showing the condition upon discharge. The improvement in the condition of the right forearm is shown in Figure 4.

The case would seem to indicate, however, (1) that the initial dose was too small, and (2) that supplementary treatment by mercury and iodids is of great advantage.

The *Wassermann reaction* before the salvarsan injection cases was negative in 2 cases, negative in another on October 4th, and positive on October 20th; positive in 3 besides the alternating case just mentioned and not obtained or doubtful in 4. The clinical features of the disease were perfectly typical in the cases that had a negative Wassermann.

After the injection of salvarsan in the dosage mentioned, the Wassermann was found to be still positive in 2 out of the 3 cases in which the reaction was tested. In both these cases the clinical symptoms of the disease had entirely disappeared.



FIG. 2.—Radiogram of left forearm, showing the thickening and destruction of lower ends of radius and ulna.





FIG. 3.—Radiogram of right forearm, showing thickening of shaft of radius.



FIG. 4.—Radiogram of right forearm, taken four months after Fig. 3, and showing improvement in shaft of radius.

In only 1 case, that of the child five and one-half years old, did the Wassermann reaction become negative, and from the reports of other observers there is no assurance that this disappearance is permanent.

Before closing I wish to express my thanks to my resident physician, Dr. Miner C. Hill, who carried out ably and skilfully the details of treatment; to Dr. I. Hirsch for the excellent radiograms, and to Dr. Gus R. Manning, who assisted me in looking up the literature.

*Conclusions.*—(1) While the indirect method of giving salvarsan to the nursing mother is valuable and should be used when the mother is available, the surest method consists in giving the salvarsan to the infant. Both indirect and direct administration should be employed whenever possible.

(2) The intravenous route of administration is the best. Usually it will be found easiest to expose the vein before attempting to insert the needle.

(3) The dosage should be not less than 0.01 gram per kilogram of body weight.

(4) Repeated injections and supplemental treatment by mercurials may be necessary.

(5) The Wassermann reaction should be followed for a year.

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# INFANTILE SCURVY AND MODERN CONDITIONS.\*

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New York.

"I had clean forgot scurvy." So said a doctor after treating "rheumatism of the legs" for two weeks. He was a good general practitioner of long experience. He said that though he had known scurvy, it had been so long since he had seen a case that the old traditions of rheumatism had quite blotted out the later impression of scurvy.

Here is the reason for the existence of this paper. There once was a time when there was no scurvy, as there was no gold in California till '49. Then there followed a "fever" of interest and everybody was hunting for this new disease, finding even slight and beginning cases. Upon this ensued a period when scurvy was anticipated by prophylactic orange juice and but little scurvy developed.

The case referred to above came into the Presbyterian Hospital last September and on entrance showed the paralysis and attitudes represented in the photographs of Series One. To this audience the diagnosis is as clear as the moon in the sky, and when I add that the child had spongy gums and a "black eye" it will seem that the old practitioner and the very new beginner need a reminder. Boiling milk an hour is no longer in vogue, condensed milk is not popular, but malt soup is. The proprietary foods are still selling and a new generation of young graduates is overflowing the land and they know not the traditions of the fathers. If I mistake not we have new conditions to meet. To safeguard milk it is to be Pasteurized, to make sure it will "keep" there may be a tendency to carry the process rather far. In addition to that there are good chances that the family may yet boil it good and hard at home.

The mother nursed the child here pictured three months at the breast. For some reason she then weaned it. Seven consecutive months thereafter she fed it on Loefflund's Malt Soup. The doctor was German and this was a favorite food with him. It is used by most baby-feeders, but seldom, however, for so long a time as seven months without interruption. I may add that the same fault appears to be active in most cases

\* Read by title at the meeting of the American Pediatric Society, Hot Springs, Va., May 29-31, 1912.



of scurvy, viz., a good food has been ridden to death (to mix the metaphor and forget to mix the food). Without describing the method of making this food (malt soup), it is well to recall that all the ingredients have been boiled. Whatever the essential cause of scurvy, long continued feeding on a food which is monotonously the same and at the same time insufficient, is a prominent factor in the etiology of the disease. "Persistent deprivation of fresh food" is a frequent expression in the literature.

The doctor sent the case to my service in the Presbyterian Hospital, stating the diagnosis to be rheumatism and that he



FIG. 1.—Showing pseudoparalysis of right leg, and attitude of restraining motion on admission.

had tried a list of remedies which, though they revealed a great and intimate knowledge of chemicals and drugs, did not say a word about fruit acids. The case entered by way of the accident ward and seemed to interest the two members of the house staff, who bent their noble brows low in thought for some time, just long enough, in fact, to allow my section class to get out of the building and so escape seeing a typical case of a disease not now very common in these parts. It may appear that errors of diagnosis are still possible, largely because the disease is so seldom seen that one cannot remember the diagnostic points. Hence this paper.

The first illustrations show the condition of the legs on entrance; the second series after two weeks of corrected regimen

and treatment with fruit juice; again another series, the last, after one month, showing complete recovery.

On entrance the symptoms were paralysis of one leg with diffuse swelling of the right leg rather more than the left. On the inner aspect of the right ankle there was a diffuse black and blue spot. The legs were flexed and immovable, exquisitely sensitive to the touch, to say nothing of moving. The patient could not move even the toes of the right foot. Arms were freely movable, not painful. The next notable feature were the spongy gums. About the three teeth on the upper row and about one incisor on the lower there was swelling with congestion. It

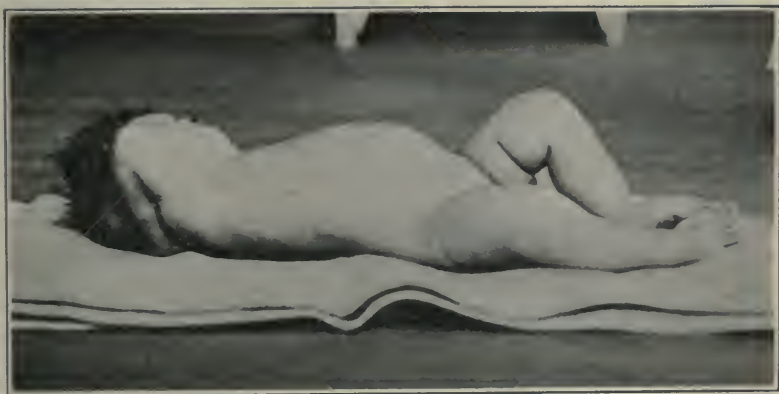


FIG. 2.—Same child as Fig. 1—different position.

should be said that the teeth of the upper row were not quite through, but almost. Spongy gums are observed only where the teeth have cut through or are just beneath the mucous membrane. The last of the three prominent features of this diagnosis was slight hemorrhage into the upper eyelid, a "black eye" on the left side, later to be followed by a similar condition on the other side. The second eye was foretold and it seemed to the staff interesting that it came as predicted and resembled the other.

*Treatment.*—First, correcting the regimen, changing from all boiled or cooked food to fresh milk. To be strictly correct, the milk was not heated at all until the time of feeding. It was diluted with barley water, that is, "modified."

Second, the child was given orange juice twice a day, each day giving it a little more than on the previous day.

*Results of Treatment.*—It is not necessary to say much about this to one who has seen a case progress toward cure. To one who has not, I may say, as I say each year to students, "There are three miracles which a doctor can perform—one is by intuition to relieve croup, one the improvement of cretinism by the



FIG. 3.—Same child after two weeks' treatment. Left leg freely movable.



FIG. 4.—Same after two weeks' treatment. Right leg still weak.

use of thyroid extract, the other the cure of scurvy by fruit juices. I consider my contention maintained in the case of scurvy.

In three to five days the pain in the legs began to subside, in two weeks the child was gaily waving one leg, and at

the end of the month it was free of all pain, waving both legs equally. It allowed any amount of handling and was discharged from hospital without a vestige of anything by which one could have a suspicion of the disease because of which it had been admitted to the hospital. The miracle was performed.



FIG. 5.—Complete recovery after four weeks of treatment.



FIG. 6.—Same, showing very free motion of both legs.

Scurvy was first noted as a disease which might be a part of children's repertory, when Cheadle and Barlow obtained autopsies on a few children dying of what was sometimes called acute rickets. This term did not satisfy the lesions that began to attract the attention of hospital observers. This was coincident in time with the appearance, in England, of proprietary foods.



In May, 1889, I made an autopsy at the Foundling Asylum on a child which was thought to have died with acute hemorrhagic syphilitic periostitis, and I so reported it to the New York Pathological Society. It nearly passed as a freak case of syphilis, a curiosity only to be found in a vast metropolitan asylum. One member present, Dr. Van Santvoord, said the case reminded him of one occurring in his experience on Randall's Island. His case was a helpless idiot, six years old, which died of hemorrhage about the femora and separation of the epiphyses. He had not recorded the case, and, in fact, had not fully understood it at the time, but subsequent reading had convinced him that it was a case of scurvy.

At the May meeting of the Pathological Society was recorded the first case of scurvy recorded from American practice. The autopsy of this case is referred to above, autopsy and record made by myself.

Keating's *Cyclopedia*, then on the market, contained an article on "Infantile Scurvy," written by an Englishman from English practice. Just at this point I was called to a real, live case, exemplifying in most striking and dramatic manner the marked characteristic attitudes and hemorrhages of well-developed scurvy. It recovered on orange juice, recommended by the English writer. With a complete autopsy and a brilliant recovery it is not to be wondered at that I was hot on the chase for more. I read the reports of these cases at one or two private medical societies and thus learned of more cases that lay far back in the memories of some present. By September, 1891, at the meeting of the American Pediatric Society, I had unearthed 11 cases, which I there reported.

At this meeting (September, 1891) my paper was lying on a chair awaiting the time for its reading when Dr. Osler came in, picked it up, asking what I was about to read on—what subject. On reading the title he said: "Eleven Cases of Scurvy?" My book has just gone to the printers and I could not find a single case of scurvy (American) recorded."

It may be of interest to this Society to recall that meeting. It was in September, 1891, Arlington Hotel, Washington, Dr. T. M. Rotch in the president's chair. The paper was discussed by Drs. Rotch, Holt, Jacobi, Putnam (Boston), Smith (J. Lewis), Fruitnight. Among those present were Osler, O'Dwyer, Vaughan, Forchheimer, Busey and Adams. It was at this meet-

ing that the American Pediatric Society was admitted to the Congress of American Physicians and Surgeons.

For a couple of years scurvy made no further history with us. No one looked for it. One saw it when one fell over it. Then the fever began and you recall the rest. Every one found scurvy, even before its full development. By prophylactic treatment it ceased to be frequent, and we arrive at the present when it is so uncommon or even rare that few students have the opportunity to see a case. We may now look for the pendulum to get so far over the line of repose as to let in more and more mistakes in diagnosis.

As I was swinging from a trolley strap to land at the hospital corner Dr. McCosh was about to get on board. "Oh, yes,"



FIG. 7.—Characteristic attitude in scurvy. Immobile legs and arms and signs of discomfort.

said Andy, "tell me quick, What are the signs of scurvy?" Answer: "If the mother says rheumatism of the legs and you find spongy gums, that's scurvy." "Right," said Andy, and he caught his car.

With more time in which to answer that question I might have added to advantage, "spongy gums and further evidences of hemorrhage," and the ground for diagnosis could be easily memorized.

The purposes of this paper will be fulfilled if the general practitioner shall here find a little help to carry in memory the salient points of diagnosis to a nutritional disturbance which, unchecked, may lead to disastrous results and may lose him the joy of working a miracle.

Finally, scurvy in infants concerns us at present:—

(1) Because with the introduction of Pasteurization the

tendency will probably be to boil the milk to insure its keeping; in other words, the cupidity of dealers will have to be reckoned with. Cooked milk is conceded to produce conditions favorable to scurvy.

(2) Because it concerns the practitioner. Bear in mind the present case—a practitioner treated it for rheumatism for weeks.

(3) Because it concerns the surgeon. Among the 11 cases first reported there were a couple in which the general surgeon diagnosed sarcoma of the bone, abscess beneath the periosteum, putting in a trochar and aspirating blood. You will recall that one thigh is usually more swollen than the other; it is hard, exquisitely tender, and the diagnosis of abscess not so strange.

(4) Because it concerns the orthopedist, and him most of all. The paralysis is marked and the case finds its way to him most naturally. I am inclined to think he sees more than any other.

(5) Because it concerns all medical specialties.

(6) Because cases occur just seldom enough to allow everybody to forget. Then, too, new generations come along who have never fallen over this wheelbarrow and consequently are not familiar with the rough and tumble fall which a wheelbarrow can give.

INSANITY IN CHILDREN.—C. Holmes states that the anatomically unstable nerve centers of the vigorous growing child offer a vulnerable field on which the maladjustments and abuses of a crowded, hustling city life may do irreparable damage. The ability to recognize the abnormal from the normal mental excitement, to appreciate that a certain form of unrest is developing as a direct result of distressing bodily or home conditions, to decide whether or not the child's conduct is due to his being fundamentally defective, to recognize the excitement of fatigue from overstudy—these are some of the things which should constitute the equipment of prophylactic workers in the homes and in the schools. Exceptional opportunities for the observation of incipient mental diseases, especially among children, are furnished by every large general hospital, but unless the hospital is equipped with special wards, specially trained nurses, and medical men for the care of such patients, these cases commonly pass through unnoticed.—*Medical Record*,

## NOTE ON THE INFLUENCE OF FOOD UPON THE INTESTINAL FLORA OF INFANTS.

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AND

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As a preliminary to the studies about to be reported, routine stool examinations were made on 15 marantic infants, all under one year of age, in the children's ward of the Cincinnati Hospital. The following schedule was observed. The stool in each case was collected on sterile gauze, marked and placed in an ice pail till examined, the time varying from thirty minutes to twelve hours.

Every stool was examined macroscopically (size, shape, color, consistency, abnormalities, such as curds, mucus and blood). Microscopically, fats, neutral fats, fatty acids, soaps, starch, crystals, abnormal constituents such as cells.<sup>1</sup>

A Gram smear was then made and inoculation made into the various media to be mentioned. This technique was followed in all cases except that in the study of the 2 special cases the stool was collected by means of a sterile anal tube after the method of Kendall.<sup>2</sup>

Routine examination for the bacillus aerogenes capsulatus (B. Welchii), according to the methods of Herter<sup>3</sup> and Kendall,<sup>4</sup> showed conclusively that the gas bacillus was not a common or a constant factor in the cases studied. Forty-six tests were made in the 12 children, 5 cases showing a positive reaction for a total of 11 positive finds. The 2 cases subsequently selected for special study had seven of these eleven positive reactions. Tests for dysentery, typhoid and paratyphoid were negative in all cases.

The 2 special cases showed practically the same clinical picture, and, though of different ages, were taking approximately the same kind and amount of food. Their stools were similar, macroscopically and microscopically. They both presented typical marantic pictures. In both cases various food modifications, for the most part containing high percentages of maltose, cane sugar or lactose, had been tried. Neither case had done well on these mixtures. It appeared to us of interest to study



the intestinal flora in these 2 cases in detail, attempting to ascertain whether definite change in the bacterial picture could be brought about by change of food.

This method of studying the biology of the intestinal flora was similar to that adopted by Kendall in his work upon monkeys, from which he determined that putrefactive flora developed on a proteid diet, acidophilic on a carbohydrate diet. Accordingly, these two children, after a complete series of examinations of the intestinal flora had been made, were given Finkelstein's albuminized milk.<sup>8</sup> The formula of this food is approximately fat, 2 per cent.; sugar, 1.5 per cent.; proteid, 3 per cent.

Each child was given 7 ounces every three hours—six feedings in twenty-four hours. The 42 ounces for each child daily gave a caloric value of 498, and supplied 6.4 grams nitrogen. We selected this food for the following reasons:—

(1) The children had both done poorly on food with higher sugar content.

(2) For the well-known therapeutic effect of lactic acid bacilli in cases showing presence of gas bacillus (which both these children had done).

(3) To obtain the high proteid in proportion to sugar content.

(4) To determine the effects clinically, and from the standpoint of intestinal flora biologically, upon cases for whom *a priori* such food might be considered indicated.

After the children had been upon this albuminized milk for three weeks, complete series of bacteriologic tests were made at intervals of a week, using stools collected by the anal tube for this purpose. Daily examinations of stools collected in the ordinary manner (sterile gauze, ice pail) were also made. The day after the second anal tube specimen was obtained (the children had been on the Finkelstein milk for four weeks) the food was again changed. The children were now given a mixture containing approximately fat, 2 per cent.; sugar, 7 per cent.; proteid, 3 per cent. made by modification of certified milk.\* Each child was given 7 ounces of this mixture every three hours—six feedings in twenty-four hours. This food has a caloric value of 791, and a nitrogen content of 6.4 grams.

\* 11 ounces 10 per cent. milk, 63 ounces fat free milk, 12 ounces boiled water, 2.5 ounces milk sugar—quantity for both cases.

This food was selected because:—

(1) The children, though in better general condition while on the Finkelstein diet, did not show a sufficient increase of weight. An increase of the caloric value of the food was thus indicated. We chose to increase the sugar, using lactose, because from our experience in the Cincinnati Hospital and the Boston Floating Hospital we had not found the lactose as injurious as the Finkelstein school would make it out to be. Besides the children had previously had other sugars without good effect.

(2) To replace the salts which the Finkelstein food reduces.

(3) Because examination now showed absence of gas bacillus, so that excessive amounts of lactic acid bacilli were not needed.

The same observations and bacteriologic tests upon specimens obtained with the anal tube were made, after the children had been taking the food for three weeks and were repeated one week later. As before, daily examinations of stools obtained in the ordinary way were carried out.

The routine bacteriologic tests carried out in both cases consisted of inoculations of fermentation tubes of sterile milk, broths with 1 per cent. each of saccharose, dextrose and lactose; 2 per cent. dextrose, with 0.6 per cent., or  $\frac{N}{10}$ , acetic acid, and 1.2 per cent., or  $\frac{N}{5}$ , acid, aerobic gelatin stabs, milk and litmus milk test tubes, anaerobic gelatin test tubes (Wright's method), and both gas bacillus tests were made daily. Gram smears of the fermentation tube sediments were made at the end of five days. The detailed bacteriologic findings, together with details as to chemical and microscopic examinations of the stools, are attached to this report.

The condensed report of the 2 cases follows:—

#### CASE I.

Hazel Reed. Aged eight months in November, 1911. Admitted to hospital August, 1911. Diagnosis at that time, gastroenteritis. Typical atrophic picture.

PERIOD I. Entrance to November 18, 1911.

*Foods Used.*—Various modifications of milk and barley water, formulæ containing high percentages of maltose, cane sugar and lactose. General condition during this period changed but little. On entrance weight was  $7\frac{1}{2}$  pounds. There were

occasional slight gains, but the general trend was downward until at the end of the period the weight was  $6\frac{1}{2}$  pounds. Temperature practically normal throughout the period.

The stools averaged one to two per day, soft to pasty green, with occasional curds and mucus. They showed fatty acid crystals in abundance. Gram fecal smears: Gram negative always with one exception. Two presumptive reactions for gas bacillus out of five tests.

PERIOD II. November 18, 1911, to December 20, 1911.

*Food Given.*—Albuminized milk (Finkelstein). Slight but steady gain in weight to 8 pounds, a gain of 1.3 pounds in four weeks. The temperature remained normal. Urine showed no indican. The stools averaged one per day, constipated, grayish-yellow, no curds. Microscopically, some fatty acids and crystals. Reaction, alkaline. Gram fecal smear: Gram negative predominate, Gram positive once.

*Bacteriology.*—Stools collected in ordinary way. Two presumptive gas bacillus tests two and three days after the food was begun, negative after that. Considerable activity in milk. (Stormy fermentation.) Gelatin: Considerable liquefaction and gas. Litmus sugar and broth test tubes=acid and occasional gas. Anal tube stools: Considerable activity in all media. See summary in chart.

PERIOD III. December 20, 1911, to January 15, 1912.

*Food.*—Certified milk modification. Fat, 2 per cent.; sugar, 7 per cent.; proteid, 3 per cent. General condition strikingly improved. Rapid gain of weight,  $\frac{1}{2}$  pound in first four days. Total gain of 2.4 pounds in twenty-six days. Temperature practically normal throughout the period except for one period of thirty-six hours. The lower incisor teeth appeared at this time. Stools, one to two daily, soft to pasty yellow with occasional curds (proteid by formalin test). Fatty acids and crystals.

Gram fecal smears: Negative predominate.

*Bacteriology.*—No presumptive gas bacillus tests. Somewhat less activity in milk and gelatin, liquefaction present but decreasing.

Anal tube stools: Somewhat less activity in media, but same types of reactions were present. See summary in chart.

We had thus definite and striking changes in the general condition and weight of the child and in the gross character of the stools in both the second and third feeding periods. (Albu-



CHART I.—HAZEL REED.  
SUMMARY OF REACTIONS (AT HEIGHT) WITH GRAM SMEARS OF SEDIMENTS.

Date and Food	Gram Fecal Smear	Milk Test Tube	Litmus Milk Test Tube	Aerobic Gelatine	Anaerobic Gelatine	1% Fermentation Tubes			2% Dextrose Ferm. Tube with Acetic Acid, n/10	2% Dextrose Ferm. Tube with Acetic Acid, n/5	Milk Ferm. Tube	Gas Bacillus Test Tube
						Lactose	Dextrose	Saccharose				
Dec. 11, 1911 Finkelstein	—	Coag. and gas in 1 day. Digestion and alkaline, 60 days	Coag. and acid in 1 day. Alkaline, 14 days; digestion, 60 days	Liquefaction complete, 14 days	Liquefaction nearly complete, 14 days	Cloudy and gas 0.75 cm. 1 day Gram +	Cloudy and gas 2.2 cm. 4 days Gram +	Cloudy and gas 4 cm. 4 days Gram +	No change Gram —	Coag. in 1 day Gas 0.75 cm. 3 days Gram +	—	—
Dec. 18, 1911 Finkelstein	—	Coag. and gas in 1 day Acid, 60 days	Slight liquefaction, 14 days 1 cm. deep 1 1/2 cm. wide 60 days	Liquefaction complete, 14 days	No liquefaction, 14 days (arborescent growth)	Cloudy and gas 2.9 cm. 3 days Gram —	Cloudy and gas 4 cm. 4 days Gram —	Cloudy and gas 0.6 cm. 6 days Gram —	No change Gram —	Coag. and gas in 1 day Gram +	—	—
Jan. 8, 1912 Modified Milk Fat, 2%; sug., 7%; prot., 3%	—	Coagulation, 1 day	Coag. and acid in 1 day; gas in 1 day; completely acid, 13 days	Liquefaction 1.7 cm. deep 1.1 cm. wide 24 days	Liquefaction 1.5 cm. deep 1.1 cm. wide 24 days	Cloudy and gas 0.9 cm. 1 day Gram —	Cloudy and gas 0.9 cm. 1 day Gram —	Cloudy and gas 2.8 cm. 4 days Gram —	Cloudiness 1 day Gram +	Coag. and gas in 1 day Gram +	—	Coag. and gas
Jan. 15, 1912 Modified Milk Fat, 2%; sug., 7%; prot., 3%	—	Coagulation, 1 day	Coag. and acid in 1 day; gas in 1 day; completely acid, 3 days	Liquefaction 2 cm. deep 1.3 cm. wide 17 days	Liquefaction 1.2 cm. deep 1 cm. wide 17 days	Cloudy and gas 1.6 cm. 3 days Gram —	Cloudy and gas 2.4 cm. 1 day Gram —	Cloudy and gas 0.6 cm. 1 day Gram —	No change Gram —	Coag. and gas in 1 day; gas 2 cm. in 4 days Gram +	—	—

CHART II.—LIZZIE CLIFFORD.

Dec. 11, 1911 Finkelstein	—	Coag., 1 day Digestion and alkaline, 60 days	Coag. and acid in 1 day Acid, 60 days	Liquefaction 1.5 cm. in 14 days	Liquefaction complete, 14 days; further in trk. 14 days; complete, 60 days	Cloudy and gas 2.5 cm. 3 days Gram +	Cloudy and gas 2.5 cm. 3 days Gram +	Cloudy and gas 1 cm. 3 days Gram +	No change Gram —	Coag. in 1 day Gas 2.2 cm. 6 days Gram +	—	—
Dec. 18, 1911 Finkelstein	—	Coag. and gas in 1 day Digestion and alkaline, 60 days	Coag. and acid in 1 day Digestion and alkaline, 60 days	Slight liquefaction, 14 days 2.5 cm. deep 1.4 cm. wide 60 days	Slight liquefaction, 14 days 2.5 cm. deep 1.4 cm. wide 60 days	Cloudy and gas 3.0 cm. 4 days Gram —	Cloudy and gas 2.7 cm. 4 days Gram —	Cloudy and gas O. S. 5 cm. 3 days Gram —	No change Gram —	Coag. and gas in 1 day Gram +	—	—
Jan. 8, 1912 Modified Milk Fat, 2%; sug., 7%; prot., 3%	+	Coagulation, 1 day	Coag. and acid in 1 day; completely acid, 23 days	Liquefaction complete, 14 days 1.5 cm. further in track 24 days	Liquefaction complete, 14 days 1.5 cm. further in track 24 days	Cloudy and gas 1.5 cm. 1 day Gram —	Cloudy and gas 1.5 cm. 1 day Gram —	Cloudy and gas 0.8 cm. 1 day Gram —	Cloudiness 1 day Gram —	Coag. 1 day Gas, 5 cm. 2 days Gram +	—	—
Jan. 15, 1912 Modified Milk Fat, 2%; sug., 7%; prot., 3%	—	Coagulation, 1 day	Coag. and acid in 1 day; completely acid, 6 days	Liquefaction complete, 14 days 1 cm. further in track 17 days	Liquefaction complete, 14 days 1.7 cm. further in track 17 days	Cloudy and gas 2.1 cm. 1 day Gram —	Cloudy and gas 2.1 cm. 1 day Gram —	Cloudy and gas 0.3 cm. 1 day Gram —	Cloudiness 3 days Gram +	Coag. 1 day Gas 1.3 cm. 3 days Gram +	—	—



minized milk and modified certified milk.) The improvement was much more marked in the third than in the second period.

There was absence of any striking change in the Gram smears and bacteriologic reactions of the intestinal flora, merely a gradual decrease in general activity in the third period.

There was absence of gas bacillus reaction after the third day of Finkelstein diet. The child continued to gain in weight after the conclusion of the third experimental period and was discharged in excellent condition.

## CASE II.

Lizzie Clifford, aged about one year in November, 1911. Admitted September, 1911. Diagnosis, gastroenteritis. Typical atrophic picture.

PERIOD I. August, 1911, to November 18, 1911.

*Food.*—Milk and barley water formulæ containing high percentages of maltose, cane sugar and lactose. Formula, fat, 3 per cent; sugar, 3.5 per cent.; proteid, 2.8 per cent.

The general condition showed no particular improvement. The weight, which on entrance was 10.6 pounds, showed slight gains and losses, but in general remained about the same. As a rule, the temperature was normal. Stools one to two daily—yellowish-green with frequent curds and mucus. Constipation at times; castor oil given frequently.

Microscopically, the stools showed a moderate amount of fatty acid crystals and soap. Gram fecal smears were generally negative; positive twice. One presumptive gas bacillus reaction out of three tests.

PERIOD II. November 18, 1911, to December 20, 1911.

*Food.*—Albuminized milk, given in same manner as in Case I. The general condition was distinctly better. There was an increase of weight of 1 pound in four weeks. Temperature normal. Urine showed no indican. Stools: One, rarely two per day, pasty yellow, no curds or mucus.

Microscopically, a few fatty acid crystals, some soap. The Gram fecal smears were predominantly negative, positive three times out of ten examinations.

*Bacteriology.*—Gas bacillus reaction on third and fourth days after the Finkelstein food was begun, but negative thereafter, stools obtained in ordinary way showed acid and some gas on litmus sugar and broth test tubes. On milk and gelatin there

was no particularly active reaction. The anal tube specimens showed marked activity on all media. (Summary on chart.)

PERIOD III. December 20, 1911, to January 15, 1912.

*Food.*—Modified certified milk, fat, 2 per cent.; sugar, 7 per cent.; proteid, 3 per cent. General condition strikingly improved. Child gained 3 pounds in twenty-six days. Temperature normal, practically during whole period. Stools, one to two daily. Pasty, yellow, soft, with occasional curds. Reaction, alkaline.

Microscopically, abundant fatty acid crystals and soap. Gram fecal smears: Gram negative with increased numbers of Gram positive organisms; Gram positive three times.

*Bacteriology.*—No gas bacillus reactions. Very little reaction in the milk test tubes, very moderate reaction in gelatin. Anal tubes specimens showed activity on all media, but in general less than that seen in Period II. (Summary on Chart.)

The child was discharged in excellent condition. We had in this case distinct improvement in the general condition, weight and gross character of the stools in both the second and third periods, though the changes were much more marked in the third period.

There were no very striking changes in the bacteriologic reactions, though there was some decrease in activity in the third period. The Gram fecal smears, however, took on a decided positive appearance in the third period. There were no gas bacilli reactions after the third day on Finkelstein's diet.

SPECIAL NOTES RELATING TO BACTERIOLOGIC FINDS NOT  
CHARTED ABOVE.

*Milk Fermentation Tubes.*—Same type of reaction with both foods.

*Gram Smears.*—Gram +. Occasional branched forms (probably bacillus bifidus) on both foods. Predominance of yeasts on Finkelstein's food.

*Milk Test Tube.*—Distinctly greater activity (coagulation gas and digestion) in Period II. (On Finkelstein's food.)

*Aerobic Gelatin.*—Marked activity (complete liquefaction) in first test, but second test in both cases on Finkelstein's diet showing slighter reaction than in either of tests on 2-7-3 food.

*Anaerobic Gelatin.*—Same as in aerobic gelatin except in general less activity. No liquefaction present on second test on Finkelstein's food.

## FERMENTATION TUBES.

*Lactose*.—All tubes showed cloudiness and gas. Average gas production in centimeters somewhat more in Period II. (Finkelstein) than in Period III. (2-7-3). Smears of sediment branched rods (probably bacillus bifidus) present in both foods (greatest number on Finkelstein's food). Many yeasts present in this first test. (Yeasts constantly present in fecal smears in both cases.)

*Dextrose*.—All tubes showed cloudiness and gas. Average in centimeters greater on Finkelstein's food than on 2-7-3. Most gas produced in this sugar, although only slightly greater than in lactose. Branched organisms (probably bacillus bifidus) present on both foods, yeasts present on both foods. (Greatest frequency on this sugar.)

*Saccharose*.—All tubes showed cloudiness and gas. Slightly greater amount in centimeters on Finkelstein's. Least amount of gas produced on this sugar. Branched forms (probably bacillus bifidus) present in all the tests. Yeasts present in considerable amounts on both diets.

$\frac{N}{10}$  *Acetic Acid: 2 Per Cent. Dextrose*.—Question of cloudiness on both diets. Small number of bacteria in smear. About the same types constantly present. Various sized Gram positive rods and diplococci and Gram negative rods and diplobacilli present. Yeast very rarely seen.

$\frac{N}{5}$  *Acetic Acid: 2 Per Cent. Dextrose*.—Question of cloudiness on 2-7-3 diet. Few bacteria, as a rule, seen in the smears. Occasional yeast present. Gram positive various sized rods, diplococci and diplobacilli, and Gram negative rods and diplobacilli present. Branched and knobbed rods (Gram negative) appeared in Period III., in Lizzie's tubes. Spore-bearing rods present in one test of Hazel's in Period III.

*Gas Bacillus Test*.—Negative on both foods. (B. Welchii.)

(The non-correspondence of the Gram smears of the sediments with each other and with the fecal smears agrees with the findings of Herter and Kendall' on this point.)

## GENERAL CONCLUSIONS.

(1) The foods used, albuminized milk and simple modified milk (fat, 2 per cent.; sugar, 7 per cent.; proteid, 3 per cent.) had very little influence on the biologic reactions of the fecal flora as a whole. There was, however, a slight lessening of the

putrefactive reactions on the 2-7-3 modification. The acidophilic flora remained about constant on both foods.

(2) Finkelstein's food is buttermilk with the salts and sugar reduced and a high percentage of finely divided proteid. To a great degree the beneficial effects of the food depend upon its lactic acid content, and in giving the food we are really using lactic acid therapy. The lactic acid bacillus flora formed during its administration was continued when the food was changed to 2-7-3, because in the latter instance the lactic acid was formed from the sugar. In other words, with both foods lactic acid therapy was given, so that it is not surprising that the bacteriologic reactions were similar in both instances.

(3) In striking contrast to the slight changes in the intestinal flora there was a remarkable change in the clinical aspect of the 2 cases. The general condition improved greatly, as did the gross character of the stools. On the Finkelstein food there was moderate but steady gain in weight, while on the 2-7-3 modification there was very marked and rapid gain in weight.

(4) The Finkelstein food was undoubtedly of marked value in both these cases. After its administration the gas bacillus disappeared in each case. Again the low sugar content of the food undoubtedly rested the gastrointestinal tract, so that after four weeks of its use an increase of sugar ad maximum (7 per cent. lactose) was not only tolerated, but utilized with great benefit to the child.

(5) Finkelstein's food is undoubtedly of great value for short periods in suitable cases, for its effect upon the intestinal flora (substitution of acidophilic for putrefactive organisms) and also because of its power to rest the gastrointestinal tract by its low sugar content, especially for cases previously overloaded with sugars.

Our thanks are due to Dr. W. B. Wherry, Professor of Bacteriology, University of Cincinnati, for his helpful suggestions and kind supervision of the bacteriologic work.

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## RETROPERITONEAL LYMPHOSARCOMA, WITH REPORT OF A CASE TREATED WITH COLEY'S FLUID.\*

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I have hesitated in reporting the result of the treatment of this case by Coley's fluid, because I did not want to decrease confidence in its value (in even a small degree) when it may have been my mode of giving it that was at fault, especially in giving too small doses, and not directly into the tumor mass. On the other hand, a report of each case may have some value, even in the hands of a physician who used the fluid for the first time, in that a collection of such cases, reported by fairly careful men, must either show the weak points in such an attempt to combat sarcoma, or the fact that in some cases, at least, the fluid is of no avail.

Most of the tumors or enlargements of lymph nodes are secondary to some original focus of disease, and represent the protective property of the lymphatic system, acting as filters for the safeguarding of the tissues beyond. But although in our case we could find no primary focus, it is difficult to say that this mass was primary, especially when the brain was not examined postmortem. Carcinoma are much more apt to cause secondary growths in the lymph nodes than sarcoma. Mallory prefers the term malignant lymphoma to lymphosarcoma.

When the mesenteric lymph nodes are involved, as Fritz Talbot so clearly emphasized in his paper on tuberculosis of the mesenteric lymph glands, read before the Section on Pediatrics at the meeting of the American Medical Association last week, the function of these glands is so impaired that the normal lymphatic route for fat digestion from the intestines through the lacteal to the receptaculum chylæ and so up the thoracic duct into the venous circulation, is blocked off and there will appear in the stools a large amount of fat, and this may even appear, as Pratt recently remarked, in cases of pancreatitis, as a layer of butter over the stools. In the case of the carbohydrate and the protein digestion, the results of assimilation and digestion are carried by the venous circulation into the portal vein, and so taken care of, as far as possible, in the liver. But disease of the

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\* Read before the Philadelphia Pediatric Society, June 11, 1912.

retroperitoneal lymph nodes is not so apt to cause this disturbance in fat digestion, owing to their different physiologic function. And this was the case in our patient, whose stools were remarkably regular and normal, and who suffered little or no pain during or directly before or after their evacuation. The liver and spleen and mesentery showing no tubercles by metastasis, and the von Pirquet test having been negative, we knew the case was not one of so-called *tabes mesenterica*.

It must not be forgotten that many cases are on record which were apparently severe cases of carcinoma or sarcoma, which have suddenly become quiescent and gradually spontaneously disappeared; it may have been through the sudden appearance of some intercurrent disease, such as erysipelas, or even apparently without any discoverable cause. One such case, the wife of a clergyman, aged sixty years, of which I personally knew the history from the daughter, but which has not been reported, has entirely recovered from a large, hard, abdominal tumor, the improvement dating from a severe attack of ptomain poisoning a year ago.

The color of the tumor rather ruled out chloroma, whose usual situation seems to be in the region of the ear, causing deafness on one side among its early symptoms, and usually producing an exophthalmos of the eye from pressure, as one of its early signs. There were no signs of Hodgkin's disease, such as involvement of the lymph nodes in the parts of the body. The final diagnosis was left entirely to the microscopic findings.

As regards the use of serum toxins, it is interesting to see the several stages through which the experiments of William B. Coley have gone during the past twenty years. In 1891 and 1892 bouillon cultures of the streptococcus of erysipelas were injected into 12 patients suffering from sarcoma, of whom 2 died of erysipelas. In the next stage, the cultures were sterilized by heat, and finally the combined toxins of erysipelas and bacillus prodigiosus, grown together, were used, beginning in 1902 and up to the present day. The idea of adding the toxins and the bacillus prodigiosus was first suggested by Roger, working in the Pasteur Institute, in 1902. He found that the virulence of the streptococcus erysipelas upon rabbits was much increased when grown in the same media with bacillus prodigiosus. It remained for Coley to first use these in combination upon a human being. His clinical results were reinforced

by the work of Martha Tracey, and S. P. Beebe, who, in 1907, working under a grant from the Huntington Cancer Research Fund, found that large multiple sarcomas in dogs rapidly disappeared under local and systemic injections of the mixed toxins.

Vaughan, of Ann Arbor, found that sarcomas in dogs disappeared under injections of toxins of bacillus prodigiosus alone, but not as rapidly as with the combined toxins.

Coley claims that first the sarcomatous tumor becomes much paler, owing to decreased vascularity; secondly, it becomes more movable and less adherent to the surrounding tissues; thirdly, it soon begins to show areas of softening due to caseous degeneration of the tumor elements; and fourthly, it gradually disappears, either by absorption or by breaking down and liquefaction of the tumor tissue. These changes occur whether the injections are made directly into the tumor or in remote parts of the body, showing that the action of the toxin is systemic rather than local.

In Coley's experience, in 10 per cent. of his cases complete absorption had taken place and the patients remained cured. In other cases, improvement has been only temporary.

The following indications for the use of the toxins have been suggested by Coley:—

(1) In all cases of inoperable sarcoma, excepting in melanotic sarcoma, which are probably of epithelial origin.

(2) In cases of sarcoma originating in the long bones, in which operation means the sacrifice of the limb.

(3) Immediately after operations (within a week or two) in all cases of primary operable cases, as a prophylactic against recurrences.

(4) In addition to the foregoing, after primary operations for carcinomas, as a prophylactic against recurrence.

The use of the toxins as a prophylactic after operations, Coley believes, offers by far the most important field of all, the proportion of recurrences in his own experience thus far (1909) being less than 25 per cent.; whereas, in cases in which the toxins were not used after operation the proportion of recurrence has been fully 75 per cent. As regards the danger in using the toxins, Coley states that, personally, he has had no sudden bad results. Several fatal cases, treated by other physicians, show that there are certain risks; most of these unfortunate results, however, are due to neglect in following the precautions



which Coley carefully emphasizes. In one fatal case, an initial dose of Mn V was given directly into a vascular tumor. In another case, an initial dose of Mn XX was given. In the first case the patient died in fifteen minutes; in the second case she remained comatose for twenty-four hours, but finally recovered, and continued to take the toxins for over a year. She is at present well, without recurrence, for over two years. In most of the few fatal cases death was due to embolism.

Coley states that he now no longer injects the initial dose directly into the tumor, but first tests the susceptibility of the patient by systemic injections into the buttocks or the pectoral regions. After a few such injections local treatment may be begun, but always at first with small doses. Coley rarely gives more than Mn  $\frac{1}{4}$  into the tumor in children, especially if situated in the neck or mediastinum, and not more than Mn  $\frac{1}{4}$  in adults.

The history of the case here reported is briefly as follows:—

Ringo I., aged six years, was born in this country of Italian parents, both of whom are healthy. The family and previous medical histories are negative. He was admitted to the children's ward of the Howard Hospital on January 15, 1912, suffering from a constant dull pain in the lower abdomen, which he had had for two months. He gave a history of having been kicked in the abdomen by another boy before the pain began, but such histories are so invariably present, especially when suggested by the question, that too much weight cannot be placed upon it. He had not had a bowel movement for four days, and had vomited several times in the past two days. The abdomen was soft and several small masses, believed to be fecal in character, were easily palpable, one mass over the bladder and to the left, and another mass to the right of the umbilicus, being somewhat larger than the rest. These two, however, seemed to be connected, and had a hard, ragged outline and were fairly movable. The child's eyes were normal. The mother said that the child had not lost over a pound or two in the past two months, but was very pale. He had a good appetite. Under soap-sud enemas, many hard scybala were passed, but the position of the masses remained the same. The lower portion was palpable between the finger in the rectum and the hand on the lower abdomen, but the mass was not in the rectum or sigmoid flexure. The von Pirquet test was negative. The child vomited five days after admission.



Seven days after admission an exploratory operation was performed by Dr. Stirling W. Moorhead, which revealed an irregularly shaped mass, low down, which seemed to be entirely retroperitoneal. There was apparently no connection with the kidney or suprarenal body of either side. The mass could not be removed, nor could even a small portion be obtained for microscopic examination. A small incision had been made, fearing that the mass would be inoperable and knowing that the intra-abdominal pressure would increase with the tumor, and therefore that as small a scar as possible was desirable. The diagnosis of lymphosarcoma of the retroperitoneal glands was made. The urinary examination on admission was negative, excepting that indican was present in a large amount. On January 30th,  $\frac{1}{16}$  Mn of Coley's fluid, containing the mixed toxins of erysipelas and bacillus prodigiosus, was injected deep into the right buttock. The fluid was obtained from Dr. Martha Tracey, of this city, acting on a grant from the Collis P. Huntington Fund for Cancer Research. The temperature had been running about  $100^{\circ}\text{F.}$  for two weeks. In five hours after the injection there was a doubtful reaction to  $102^{\circ}\text{F.}$  from  $100\frac{2}{3}^{\circ}\text{F.}$ , with slight nausea. On January 31st, at 6 A.M., the temperature was  $100^{\circ}\text{F.}$   $\frac{1}{2}$  Mn Coley's fluid was again injected into the right buttock with no reaction. On February 2d, February 5th and February 10th, gradually increasing amounts of Coley's fluid were injected up to Mn  $\frac{1}{4}$  on the last date, when there was marked reaction from  $99^{\circ}$  to  $102\frac{2}{3}^{\circ}\text{F.}$  in six hours. On February 20th,  $\frac{1}{4}$  Mn was again injected, with a reaction from  $100^{\circ}$  to  $102^{\circ}\text{F.}$  in four hours.

On February 28th,  $\frac{1}{2}$  Mn was injected, with a reaction from  $99\frac{1}{2}^{\circ}$  to  $101\frac{2}{3}^{\circ}\text{F.}$  in eight hours.

On March 1st, 1 Mn was injected, with a similar rise from  $100^{\circ}$  to  $103\frac{2}{3}^{\circ}\text{F.}$  from 10 A.M. to 6 P.M.

On March 11th, Mn 1 was again given with practically no reaction, and on March 13th, 2 Mn were given with a rise from  $100\frac{2}{3}^{\circ}$  to  $103\frac{2}{3}^{\circ}\text{F.}$  in two hours.

The growth of the tumor did not seem at any time to be influenced by the treatment, the mass becoming larger and larger, and stretching the scar from the first incision more and more. On February 24th, Dr. Moorhead punctured the tumor through the abdominal wall, near the old incision, but obtained only a small amount of serum.

On March 12th, the feet and legs became very edematous and the face was swollen. The child died on March 15, 1912.

The blood count on January 30th, just before injecting the first dose of Coley's fluid, was:—

Hemoglobin (Dare's) .....	57 per cent.
Red blood corpuscles .....	3,820,000
White blood corpuscles .....	32,640

The differential count showed:—

Polymorphonuclears .....	66 per cent.
Lymphocytes .....	24½ “ “
Large mononuclears .....	3 “ “
Transitionals .....	5 “ “
Eosinophiles .....	1 “ “
Basophiles .....	½ “ “

No nucleated red blood corpuscles. No myelocytes.

On February 12th the count was much the same. There was always a leukocytosis. The blood culture was negative.

Postmortem examination by Dr. S. W. Moorhead.

The postmortem examination was limited because of refusal to grant permission, excepting to examine the tumor by opening the old scar. The tumor was attached to the anterior abdominal wall about the scar and had infiltrated its entire thickness, both in the mid-line and downward and to the left, in spite of the fact that the tumor had not been incised nor roughly handled at the time of the operation. To reach the free peritoneal cavity the incision had to be extended upward to the umbilicus, the opening of the peritoneum being followed by a full flow of fluid of a brownish color, in which floated a number of flakes of coagulated lymph. About a pint of fluid was present.

Especially in the lower part of the abdomen many of the coils of intestine were plastered together by adhesions, though some of the coils were entirely free and normal in appearance.

The tumor itself extended from the pelvis well up to the diaphragm. It was composed of large nodular masses which originated from the region of the spinal column, and proceeded between the layers of the mesentery. The consistency in the lower portion of the tumor was greater than in that part lying in the upper half of the abdomen. The lower portion was also

lighter in color than the upper portion, which had a deep purple tint, contrasting with the yellowish hue of the lower portion. We rather felt that this upper portion had begun to respond to the toxins. On section, the upper portion exhibited a reddish-purple pulp. Section of the portion in the lower abdomen revealed much firmer tissue of a yellowish color. Specimens were taken from the tumor in the abdominal wall, from the portion in the lower abdomen and from the portion in the upper abdomen. The liver, spleen and kidneys were normal to palpation. A specimen of the right kidney was taken for examination.

The microscopic examination of sections of the tumor was made by Dr. Bernard Mann, and showed a round-cell proliferation, with no giant cells, no spindle cells, no cells in mitosis, and very much resembling glandular tissue. The diagnosis of lymphosarcoma was confirmed.

Especial credit should be given to Dr. Francis Brinton Jacobs for the interest and care with which he pursued the treatment in this case, when the children's wards at the Howard Hospital were turned over to him early in the treatment of the case, and my term for the year expired.

We should also like to express thanks to the Huntington Cancer Research Fund for the free use of the Coley's fluid.

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INFANTILE BERI-BERI.—E. Calderon (*Bulletin of the Manila Medical Society*, August, 1911) gives an account of a disease called "Taol" or "Taon," which is very prevalent in the Philippine Islands, and destroys many infant lives. Formerly the disease, which is of a convulsive nature, was looked upon as an eclampsia of infants, but it appears that, in 1904, Guerrero showed the complaint is really a form of toxemia, identical with that of beri-beri, transmitted through the mother or wet nurse by the milk. It also seems that in Manila breast-feeding is far more common than in many countries. Acting on this notion, institutions for the free distribution of sterilized milk have been opened with most gratifying results. It is important to correlate such facts as these with what is known, or hinted, as to the presence of thyroid substances in mother's milk, and it is possible that we may have to recognize, more fully than at present, the influence on the child of conditions affecting the maternal metabolism.—*Universal Medical Record*.

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# CHRONIC COLITIS IN A CHILD THREE YEARS OF AGE, WITH DEFORMITY OF THE SIGMOID.

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AND

LEON THEODORE LE WALD, M.D.,

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Aynard, S. W., came under my care, June 2, 1909, with the following history: He was born January 3, 1909, first child. Weight,  $6\frac{1}{4}$  pounds. He was nursed six weeks, then on mixed feeding for two weeks, and finally on modified milk. At three months he was exclusively on the modified formulæ found in Dr. Holt's small book.

Up to the time I saw him—June 3d—he had never had a normal bowel movement. They were always green in color, containing curds, alike on the mother's breast and modified milk. For the most part, the child was uncomfortable, crying a great deal. Notwithstanding the discomfort and the character of the bowel movements, he almost doubled his weight at the end of three months. At the time of final weaning, the mother had a severe attack of influenza, and the baby later contracted the disease.

During the month of May his weight decreased to between 9 and 10 pounds, and when I saw him June 2d he was dull, apathetic, at times almost in stupor. He would cry out occasionally as if in pain.

On examination I found his head boxy and a beginning rosary present.

After several trials, a modified milk, with fat percentage under  $2\frac{1}{2}$ , and not exceeding 18 grams per day, was found to agree best. Gradually the stupor disappeared and he improved rapidly until the first part of August, when he had a sharp attack of diarrhea, with stools containing large amounts of mucus. During this attack there was a slight return of the stupor, with subnormal temperature persisting throughout.

The latter part of August another attack occurred with larger



amounts of mucus in the stools, without stupor, but with continuous fever. This attack had not entirely subsided when, in the beginning of September, all the symptoms became rapidly worse. There was vomiting, and as many as forty bowel movements in twenty-four hours, all containing large amounts of mucus. Temperature up to 40 C., considerable pain and much tenesmus. This exacerbation occurred before the child had been returned to a milk diet and was rather difficult to account for.

During the first few days of this illness irrigations were tried, but were only occasionally successful it being impossible to pass the tube higher than 6 inches, while at other times it would go up with moderate ease. However, they had to be discontinued on account of tenesmus.

After two weeks he was put on whey, and later on a whey top-milk mixture, on which he gained. After some days of improvement he weighed 9 pounds. While he did fairly well on the whey top-milk mixture, he did not gain as rapidly as was desired and finally developed a troublesome general edema, which continued for more than a week. Repeated examinations of urine showed neither albumin, casts or renal epithelium.

On October 15th goat's milk was substituted for the whey top-milk mixture and improvement was marked from the beginning. After four or five days he began to have bowel movements, which were yellow and smooth, for the first time, instead of green, with curds and mucus, but, inclined to constipation. The supply of goat's milk for his entire nutritional needs lasted for six weeks, after which whey top-milk mixtures were used in conjunction with the goat's milk.

During the latter part of the winter and early spring, careful and painstaking dietary observations were made with the following results: When eggs were given, even in small quantities, edema and urticaria resulted. Starches, such as potatoes and most cereals, increased the size of the stools markedly, which were already abnormally large, predisposing to acute attacks of colitis.

In April, 1910, after a period of digestive disturbance, there appeared in his movements large quantities of clear mucus, frog spawn stools (Pfuandler and Schlossman), containing many membraniform flakes, with subnormal temperature, stupor, tenesmus and vesical irritability. This attack lasted for two weeks.

In May a new supply of goat's milk was available, upon

which he again improved. However, in July, a similar attack occurred, and in October a worse attack, which the mother attributed to the introduction of cooked fruits into his diet, such as apple sauce, etc.

During the winter there were numerous relapses, accompanied by his reference to discomfort and pain in the region of the bladder and vesical irritability, which was relieved by free evacuation of the bowels.

During January, 1911, he developed a number of nervous phenomena, namely, scratching and irritability of anus and picking nose and ears. An examination showed an anterior anal fissure, which healed promptly under treatment. On March 30th there was an attack, characterized by an unusually large amount of mucus, which continued two weeks, with increased vesical irritability and localized pain in the region of the bladder.

In April, 1911, a severe attack occurred, since which time the exacerbations have been more and more frequent, and the remissions less complete and of shorter duration; vesical irritation and local pain in the lower abdomen almost constant.

Examination of urine April 13th was found alkaline in reaction and contained leukocytes, triple phosphates, urates of soda and ammonium. Likewise, on April 17th. He was then put on saccharine, benzoate of soda and urotropin.

On April 24th, urine slightly acid. May 5th it was again slightly alkaline, containing a few leukocytes, earthy phosphates and urates. Treatment continued. On September 30th the reaction was acid, and there were many uric acid crystals. At this time he was sent to Dr. LeWald for X-ray examination for a possible urinary calculus. This being negative, it was decided to make a number of X-ray plates under a bismuth meal and injection. Upon this, Dr. Le Wald will report.

The history of this case, taken in connection with the X-ray findings, presents a number of interesting questions involving, first, the etiology; second, the symptomatology and diagnosis; third, the treatment.

*Etiology.*—(a) Are all these cases of chronic colitis due to deformity or deviation of some portion of the colon?

(b) Are such deformities and deviations always congenital or may they not result from acute attacks of colitis of bacterial origin, the deformity being produced by severe tenesmus or excessive irrigation?

(c) Inasmuch as many of the cases of colitis in adults have been shown by X-ray diagnostic methods to have marked deformity and deviation of the colon, some of which have been improved and even cured by surgical measures, it is a question whether or not these cases have been congenital, and, if so, to what extent symptoms of the condition were present during infancy and childhood.

*Symptomatology.*—Large amounts of mucus, free and mixed with fecal matter, occurring, at first, at intervals, gradually becoming more continuous. Large, copious stools out of all proportion to amount and character of food taken, constipation, alternating with diarrhea. Exacerbations becoming more and more frequent. Localized pain or discomfort, vesical irritability and urgency, and the development of a marked precocity along neurasthenic lines, have been the dominant symptoms in this case.

*Methods of Diagnosis.*—Formerly, the more refined attempts at diagnosis were along bacteriological lines and gave no enduring results. The successful use of the bismuth test meal and enema, with X-ray examination, was eminently successful in this child of three years, hence we are firmly convinced that, in all cases of chronic digestive disturbance in children, this procedure should never be omitted from the examination.

*Treatment.*—The points of interest presented in a discussion of the treatment are medical, hygienic and surgical.

The points to be considered from the medical side are, first, that the deformity and deviation obviously cannot be corrected by medical measures, hence medical success depends on the ability of the deformed intestine to functionate normally after the mucus surfaces had been treated medicinally. Also, if improvement should follow such treatment, would it be lasting?

Plainly, these conditions in any case should be considered and watched by both the pediatrician and surgeon, in order that treatment may be prompt, correct and adequate.

The report of this case has been made as brief as possible. All the minor symptoms have been passed over and only important and leading symptoms and developments mentioned, in order to give more time for a full and free discussion.

We believe a new field in pediatric surgery may be opened as a result of this refinement in diagnosis. In this case, for instance, dietary and medicinal measures have been tried faithfully without avail. Irrigations have given temporary relief, but

must be continued daily. Their continued use has so impressed the little patient that he talks of little else and is fast becoming a confirmed juvenile neurasthenic.



FIG. 1.—Bismuth by mouth. Exposure made twenty-six hours later. Note size and shape of sigmoid.

*X-Ray Findings.*—On November 28, 1911, a test meal, consisting of subcarbonate of bismuth, 30 grams; 1 hard-boiled egg,



one-half a shredded wheat biscuit, 100 c.c. broth, and 2 slices of toast, was given at noon. An exposure was made 10 minutes after the completion of the meal. It showed that the stomach even at this very early interval after the ingestion of food (a considerable portion of which was solid, too) had begun to



FIG. 2.—Blismuth injected by rectum. Note the length and convolutions of sigmoid.

empty itself. This is exceedingly interesting, as it confirms for children what has become very common knowledge in regard to adults, namely, that the stomach with a normal pylorus begins to empty itself the very moment food is put into it.

The *stomach* is moderately dilated. It measures 6 cm. in its transverse diameter by 14 cm. in its long axis. Its position

is such that the greater curvature just reaches the umbilicus. (Note that the radiographs were made with the patient in a standing posture.) The shape is that of the letter "J."

Radiographs made at short intervals showed that in one hour some of the meal had reached the cecum. This confirms another interesting observation, namely, that the time it takes food to go from the pylorus to the ileocecal valve is from one to two hours in children, and from two to four hours in adults.

At the end of four and a half hours the examination ceased for the day. The stomach still contained some residue of the meal, thus confirming the earlier finding of moderate dilatation and the additional one of delayed motility after the first two hours.

At the end of twenty-six hours after the ingestion of the test meal a radiograph was made. (Plate 1.) It revealed several interesting facts. The cecum is situated lower than normal, and it has failed to empty itself completely, although the greater part of the test meal has passed through it and on to the sigmoid flexure and rectum. The transverse colon contains a large amount of gas, particularly evident in the region of the hepatic flexure and splenic flexure. The most striking feature, however, is the peculiar appearance of the *sigmoid flexure*. It presents a long circular loop, which reaches the level of the umbilicus and passes so far to the right that its shadow actually overlaps that of the cecum. The lumen of this portion of the colon is distinctly dilated.

A radiograph made at the beginning of the third day showed traces of the test meal in the cecum and in the long loop of the sigmoid.

After an interval of ten days a further study of the colon was made by means of a careful injection of the following mixture, bismuth subcarbonate, 30 grams; bolus alba, 60 grams; water, 400 c.c. Within ten minutes the mixture had reached the ileocecal valve. The series of radiographs (Plate 2) taken at this time show in a most striking manner the length and looping of the sigmoid flexure. This is still more evident in the stereoscopic roentgenograms (Plate 3), a study of which shows that the redundancy of the sigmoid can be resolved into three loops passing through different planes, reminding one somewhat of the relations between the planes of the semicircular canals of the ear. The first loop passes upward to the level of the umbilicus, thence downward and to the right. The second loop then

passes on a nearly horizontal plane forward and to the left. The third loop passes backward and thence downward to the rectum. The combination of the second and third loops forms a complete "pigtail" outline.

In our opinion this condition of the sigmoid is by no means the simple elongation seen in the fetus or the newborn. The growth of the colon "at the expense of the sigmoid flexure" is a matter which is well known, but the fact that *this process should be completed within the first few months after birth* (four months—Treves) does not appear to be so well recognized. It is therefore unreasonable to presume that in this case "the



FIG. 3.—Stereoscopic Roentgenograms. To be viewed through stereoscope. Note convolutions of sigmoid in various planes.

child will outgrow the condition." On the contrary, the time has already passed when this would have occurred normally. And, in fact, what has actually occurred is a *failure* of the colon to grow at the expense of the sigmoid. Evidence of this may be seen in the very short, high, transverse colon actually present.

This abnormal redundancy of the sigmoid constitutes a serious pathologic condition. And although it may give few symptoms in some individuals, in others the reverse is true, and that it may actually lead to a fatal issue in the adult cannot be denied. One of us (LeWald), in a series of 5,000 postmortem examinations, has met with volvulus in this type of sigmoid three times.

When met with in early life, this condition of the sigmoid, if giving symptoms, well deserves serious consideration as to the advisability of surgical relief.

## SOCIETY REPORTS.

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### THE PHILADELPHIA PEDIATRIC SOCIETY.

*June 11, 1912.*

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

#### HEART DISEASE.

DR. JOHN F. SINCLAIR showed a baby, aged two years and four months, with congenital heart disease. The child's only illnesses have been three or four attacks of bronchitis. There have never been cyanosis, clubbing of fingers, edema, or hemorrhages. Dyspnea has never been marked. The right side of the heart is enlarged and there is a loud systolic murmur. The causes of congenital heart disease are persistence of fetal conditions, fetal endocarditis and malformations. In spite of the absence of symptoms in this case, the prognosis must be guarded.

DR. ALFRED HAND, JR., showed a girl with acquired heart disease, who was apparently benefited by Nauheim baths.

DR. LE BOUTILLIER spoke of the contrast between these two murmurs: the loud murmur in the first, and the blowing murmur in the second case.

#### INFANTILISM OF HERTER.

DR. MAURICE OSTHEIMER showed an Italian girl, born January 18, 1905, who was admitted to the University Hospital in January, 1912, just seven years of age. Parents, sisters and brothers are all well. She was normal until eighteen months old, except for some rickets. She was breast-fed up to twenty-one months, but also had table food. At eighteen months she had whooping-cough, and has failed to grow much since, though she is mentally quite what other children of seven are. She used to have many attacks of indigestion, probably due to improper food, and occasionally an attack of diarrhea. She would at times be



very drowsy, and became fatigued easily. Upon admission, her fontanel was open, abdomen large, epiphyses enlarged, legs slightly bowed and marked sweating noted about her head. Her fontanel is still as large as a dime. She is said to have had an excessive appetite, but this has not been noted in the hospital. She has been very pale at times. There is no enlargement of spleen or liver, and no other physical signs now. Her height on admission was 29 inches, and her weight  $19\frac{1}{2}$  pounds; now she is  $30\frac{1}{4}$  inches high and weighs  $21\frac{1}{2}$  pounds. Examinations of the feces recently have not shown the characteristic bacteria of the infantilism of Herter. No excess of fats was found in the feces. The urine, with a specific gravity of 1.020, always shows a trace of albumin, but no casts have been found during the last four months. Her blood on admission gave 58 per cent. hemoglobin; 3,440,000 reds and 11,000 whites, of which 69 per cent. were polymorphonuclear, 4 per cent. mononuclear, 6 per cent. transitional and 21 per cent. lymphocytes; on June 9th, 70 per cent. hemoglobin; 4,000,000 reds and 8,000 whites, of which 36 per cent. were polymorphonuclear, 16 per cent. mononuclear, 2 per cent. transitional and 46 per cent. lymphocytes. Upon thyroid extract for three months she failed to gain; upon pituitary extract for the past month she has gained 2 pounds. Clinically, the child seems to be a case of Herter's infantilism, now in the stage of gain. Only if she relapses and definite laboratory studies are made, can an exact classification be made.

DR. HOWARD CHILDS CARPENTER spoke of Dr. Kerley's recent use of thymus extract in a case of arrested development, and asked if it had been given in this case. Dr. Ostheiner replied that thymus had not yet been tried in this case.

DR. HOWARD KENNEDY HILL said that it was interesting that the number of lymphocytes in the differential blood counts reported were very high, resembling those found in a child of the size and appearance of this one, rather than of the age of this child.

#### OSTEOMA OF THE TIBIA.

DR. J. TORRANCE RUGH showed a specimen of osteoma removed from the upper end of the right tibia of a girl sixteen years old. There was absolutely nothing in the family or personal history which bore a causal relationship to the growth. While she

first noticed enlargement just below the knee over a year ago, she had had no discomfort until within the past few months. Pain was entirely absent. On operation, the growth was found to be pedunculated, exactly like a head of cauliflower. There were no other growths in any other part of the body.

PHILADELPHIA PEDIATRIC SOCIETY PRIZE.

The President then announced the award of the Philadelphia Pediatric Society Prize of One Hundred Dollars to Dr. John Albert Kolmer for his essay, entitled "Studies in Diphtheria."

LEUKOCYTIC INCLUSION BODIES IN SCARLET FEVER.

DR. KOLMER read an interesting paper showing that the leukocytic inclusion bodies were found in many other conditions beside scarlet fever. His investigations embrace a large number of cases of scarlet fever, diphtheria and other conditions.

RETROPERITONEAL LYMPHOSARCOMA.

DR. HILL reported a case in an Italian boy of six years, following a kick in the abdomen two months before. Exploratory operation showed an inoperable retroperitoneal sarcoma, and Coley's fluid was used, beginning with 1-16 of a drop and increasing to 2-drop doses. Marked leukocytosis was noted before and after the injections, with fairly normal differential count. The tumor gradually increased in size, and death occurred in two months.

DR. F. B. JACOBS said that this was the first case in which he has used Coley's fluid. The only true reaction noted was after the injection of two drops. At autopsy, much bloody fluid was found in the abdominal cavity. Dr. Jacobs wondered whether this accumulation of fluid could have been due to the disintegration of the tumor produced by Coley's fluid, the absorption of which possibly killed the boy. He quoted extensively from an article by Dr. J. Dutton Seele, who reported 61 cases of retroperitoneal lymphosarcoma, quite common under ten years of age, and in males rather than females; on the right side rather than on the left. In most cases death occurred within eight months. This boy passed very little urine, 5 to 7 ounces a day.

DR. J. NORMAN HENRY referred to 2 cases which he had treated last winter without success in the Pennsylvania Hospital. One was a case of mediastinal sarcoma, inoperable, producing widespread pressure symptoms. Injection of Coley's fluid directly into the tumor produced marked reaction. The mass became softer at the site of the infection, and the area of dullness seemed to be diminishing; but treatment was abandoned at the patient's request, because of the great prostration after the injections. The second case was acute lymphatic leukemia, with a large lymphosarcomatous mass in the mediastinum, found at autopsy. Again Coley's fluid did no good.

DR. W. E. LEE reported a case of osteosarcoma of the lower jaw in the service of Dr. Gibbon in the Pennsylvania Hospital, which had recurred after thorough removal and then entirely disappeared when Coley's fluid was given. There was no further recurrence at the end of one year. A second case of sarcoma of the thigh, also in Dr. Gibbon's service, was reported, in which, after removal of the tumor, the wound became infected with streptococci. Here again there was no recurrence after one year.

#### HYPERPYREXIA.

DR. HARRY LOWENBURG reported a case of rectal temperature, which, as noted by two thermometers, was 108.6°F. This occurred in an infant of seven months, marasmic, after an attack of diarrhea, from which the baby had recovered. Weight was 16 pounds. Three days before death coryza, cough and fever were noted. On the third day convulsions occurred, with unconsciousness and the temperature above noted. All treatment seemed of no avail. Autopsy was not permitted.

#### MASSAGE BALL FOR CONSTIPATION IN INFANTS.

DR. LOWENBURG also exhibited a massage ball to be used in the treatment of constipation in infants and children. He has them made in two sizes—one weighing a little less than a pound; the other weighing two pounds. They are of iron, covered with leather, and resemble a base-ball. The mother or nurse rolls the balls over the course of the colon, using no other pressure than their own weight. This is done for about five minutes, night and morning. After this they are rolled in a circular fashion over the

small intestine for one or two minutes. Dr. Lowenburg found excellent results from these balls, after all other things had failed, in cases of obstinate constipation. Older children enjoyed using these balls, playing with them.

DR. LE BOUTILLIER asked whether this was any better than proper colonic massage, deep massage, properly carried out, over the colon. He has had very good results with colonic massage, when it is properly given.

Dr. Lowenburg answered that he found that the mothers would not give proper colonic massage, and that he had devised this ball on that account.

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THE RECURRENCE OF ADENOIDS.—T. Guthrie (*Lancet*, April 20, 1912) states that the most important factor in the recurrence is the age of the child. In children under four years of age there is decided risk of recurrence; between the ages of four and seven the chances of recurrence are slight, and after the age of seven they are practically *nil*, always provided that the operation has been complete. Apart from the influence of age, it is certain that recurrence is much favored by an attack, within a short time of the operation, of one of the specific fevers, especially measles or whooping-cough. Again, according to C. Parker, in children who are the subjects of congenital syphilis recurrence seems to be the rule rather than the exception, unless the general condition is carefully treated. Lastly, recurrence is probably favored by the presence of untreated anterior nasal obstruction, especially hypertrophic inferior turbinals, and is therefore apt to be met with in patients with high arched palates and narrow nasal cavities in whom removal of the adenoid does not lead to the establishment of free nasal respiration. All of these conditions have the feature in common that they tend to excite or maintain a state of chronic postnasal catarrh, which should, therefore, wherever it is present, receive appropriate treatment if the risk of recurrence is to be reduced to a minimum. In conclusion, it is remarked that a true recurrence of adenoid vegetations is a somewhat rare event, even in the case of young children, and the fear of it affords no valid argument against operation.—*Medical Record*.



## CURRENT LITERATURE.

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### ABSTRACTS IN THIS NUMBER BY

DR. T. WOOD CLARKE.	DR. C. D. MARTINETTI.
DR. CHARLES E. FARR.	DR. W. A. MURPHY.
DR. J. S. LEOPOLD.	DR. WILLARD S. PARKER.
DR. WILLIAM LYON.	DR. RICHARD M. SMITH.
DR. S. W. THURBER.	

### DISEASES OF THE EAR, NOSE AND THROAT.

HELLER, ISAAC M.: A CASE OF PRIMARY JUGULAR THROMBOSIS. (*Annals of Otology, Rhinology and Laryngology*, June, 1912, p. 380.)

This patient, a girl of seven years, was first seen by the author April 12, 1911, complaining of severe pain in the left ear. There was a history of a double otitis when two years of age; in October, 1909, a radical mastoid operation was done on the right side, when the inner ear was also destroyed with complete loss of function on that side; the left ear had been continually discharging; the hearing was poor on the left side. The left drum was incised because of bulging and the temperature dropped from 102.6° to 100° F. Three days afterward the patient was reported as quite ill and had had a chill on the second day; the temperature was now 103.5° F. by mouth; the drum looked as when last seen; there was a moderate discharge with no tenderness or swelling. She was admitted to the Lebanon Hospital, where the blood count was found to be 25,000 leukocytes with 80 per cent. polymorphonuclears. She had another chill, and operation showed nothing in the mastoid nor sinus from knee to bulb. The antrum was separated from the sinus by a thin wall of bone and contained a small amount of pus. A small drain was inserted here and the wound closed with a drain. The temperature went to normal, but rose in the morning to 106° F. with a chill; that evening another chill was reported and it was decided to tie off the jugular, which was done before reopening the mastoid wound. Odorous pus continued to flow from the petrous bone and an irregular temperature kept up for about a week. She left the hospital three weeks after the first operation with still some odorous discharge; she is totally deaf and does not react to labyrinthine tests.

The case shows several interesting conditions; the tempera-

ture curve showed a septic thrombus somewhere, which, in view of the operative findings, was probably in the bulb itself.

The child can talk, showing she has not forgotten speech; she does not use signs, but reads lips. S. W. THURBER.

YEARSLEY, MACLEOD, F.R.C.S., ENG.: CAUSES LEADING TO EDUCATIONAL DEAFNESS IN CHILDREN. (*The Lancet*, July 20-27, 1912, pp. 138, 143 and 228-234.)

The author gives an exhaustive report of some 1,076 children observed by him personally, 55 per cent. being acquired cases.

He details fully the woeful effects of superstition and ignorance on the part of parents and ignorance and indifference on the part of physicians. He deems measles, scarlet fever and small-pox of greater importance than the other acute infectious diseases as causative factors; congenital syphilis should be remembered as a possibility in many doubtful cases. It is the so-called primary cases which give the greatest opportunity for prophylaxis. The adequate treatment of adenoids and other nasopharyngeal conditions is urged; this means not only proper operative treatment, but sufficient after-treatment to secure the best possible result in each case. He says that the best time to treat educational deafness due to otitis is before otitis has developed, and to do this we must go back to the infant. Fully 50 per cent. of the children who suffer from middle ear disease and who will ultimately become permanently deafened may be cured. As the majority of these children come first under the care of the general practitioner, he should be fully alive to the situation and adequately investigate and treat these cases, or if not prepared to do so see to it that they get what they need, for upon him rests the full onus of responsibility.

WILLIAM LYON.

HAYS, HAROLD: REPORT OF A CASE OF ACUTE MASTOIDITIS IN A CHILD, FOLLOWED BY ACUTE MENINGITIS AND LABYRINTHITIS. (*Annals of Otology, Rhinology and Laryngology*, June, 1912, p. 377.)

This little girl of eight months was admitted to the New York Eye and Ear Infirmary, December 23, 1911, with a history of several days of fretfulness and for one day a slight swelling and

redness behind the left ear with no discharge. The swelling was not very tender nor did it fluctuate. The drum was found to be slightly bulging. The temperature was 100.4°F. per rectum. On opening the mastoid the skin, periosteum and bone appeared normal, but when the cortex was broken through the whole mastoid was found to be destroyed. This was cleaned out by a complete operation and a counter drain placed through the drum. After the first twenty-four hours the temperature began to rise; the wound was examined and found to be in good condition, with very little discharge. The child then developed a septic condition, nystagmus was noticed toward the left, a lumbar puncture showed thick, turbid fluid under pressure, and smears revealed a mixed infection, streptococcus capsulatus predominating. The blood count revealed the following: Red cells, 4,800,000; white cells, 8,800; large lymphocytes, 12.8 per cent.; small lymphocytes, 60.2 per cent.; polynuclears, 18.6 per cent.; the child died five days after the operation.

The interesting features in this case are no discharge, normal looking mastoid cortex, none of the usual meningeal signs, except stupor with the cerebrospinal fluid under great pressure, unusual blood count. The question as to the probable route of infection is in doubt.

S. W. THURBER.

MACKENSIE, JOHN N.: THE MASSACRE OF THE TONSIL. (*Annals of Otology, Rhinology and Laryngology*, June, 1912, p. 416.)

In considering the question of tonsillar operations the following facts must be taken up: (1) The functions of the tonsil are, in the present state of our knowledge, unknown. Until these functions are definitely fixed no final law as to operations can be laid down. (2) They undoubtedly are producers of leukocytes and not lymphatic glands. (3) It is practically impossible to separate the tonsil from adjoining structures during an acute infection, though there is much less glandular involvement when the infection is limited strictly to the tonsil than when other structures in the pharynx are included in the process. (4) The rôle of the tonsils as portals of infections has been greatly exaggerated. Less absorption can occur through them than through the more receptive lymphatics of the nose and nasopharynx. (5) The hypertrophied lymphatic tissue of the pharynx-

geal vault does harm chiefly through obstruction. Restore normal respiration in the child and the tonsils will take care of themselves. (6) The mere size of the tonsil is no indication for its removal unless it interferes with breathing, speech or swallowing, in which case a total tonsillectomy is not at all necessary. (7) An instructive part of this subject is the infection of the tonsil from the nasal passages and from improper care of the teeth during dentition. There would be fewer tonsillar operations if better care were taken of the teeth and noses of infants and young children. (8) In the light of the author's experience, enucleation, except in cases of very much diseased tonsils, may be supplanted by other methods just as safe and efficient, and not open to its many objectionable features. (9) That the tonsil has some function is shown by its reappearance after enucleation. (10) The tonsils are part of the mechanism of phonation and singing may be ruined by removing them. The operation of tonsillectomy is a capital operation and should be done only by a skilled surgeon under the best surroundings, where the gravest emergency may be quickly met.

S. W. THURBER.

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## SURGERY.

SUTCLIFFE, W. G.: TREATMENT OF TUBERCULOUS GLANDS OF NECK IN CHILDREN. (*Practitioner*, London, May, 1912.)

The author believes that in the great majority of cases of cervical adenitis in children the tonsils and adenoids are primarily at fault, that the inflammation is simple at first, but furnishes a good medium for the growth of tubercles. These are the cases that do so well under the fresh air, forced feeding and tuberculin treatment. Operation or even the tuberculin treatment will not be necessary in the early cases provided that tonsils and adenoids are promptly treated and the general health of the child is looked after. Glands present more than six months, however, are probably caseated and will have to be removed sooner or later. The essential point is that sufficient rest should be given to the patient. Glands disappear as quickly without the use of tuberculin as with it, and if it is given, great caution must be used, as serious reactions follow too large a dose. Each case is a law to itself. Where sinuses exist an operation is usually necessary



to remove the glands, and the author advocates very thorough post-operative treatment and rest, avoiding, however, the use of tuberculin during the first month. He believes that post-operative induration clears up more rapidly, and infection of nearby nodes is less likely to happen when tuberculin is used.

CHARLES E. FARR.

VINCENT BETH, M.D.: BLOOD TRANSFUSION FOR HEMORRHAGIC DISEASE OF THE NEWBORN: THE USE OF THE EXTERNAL JUGULAR VEIN IN INFANTS. (*Boston Medical and Surgical Journal*, April 25, 1912, p. 627.)

The writer cites 4 cases of hemorrhagic disease that were treated by transfusion from the radial artery to the external jugular vein through wax-coated glass tubes, all followed by recovery. The relatively large size and easy accessibility of this vessel and its proximity to the heart should make it the one to be chosen for this operation. The rapidity of flow can be easily controlled by pressure over the artery of the donor.

WILLIAM LYON.

FAIRBANKS, HAROLD, A.T.: APPENDICITIS IN CHILDREN. (*The Medical Press and Circular*, June 26, 1912, p. 664.)

The relative small size of the cecum and large size and wide funnel mouth of the appendix in the child as compared with the adult makes it easier for foreign matter to enter and leave the organ in the child than in the adult. The great omentum is shorter and higher in the child than in the adult and is therefore less useful in forming adhesions. In children appendicitis is far more apt to lead to abscess or general peritonitis than is the case in adults. Concretions are rare in children. Thread worms probably play a not unimportant part in the etiology. Appendicitis is less common in infants than in children over five. It may occur at any age. Intestinal upsets, bad teeth and tonsils, influenza and rheumatism probably all play a part in etiology. Injury may play a part. The signs and symptoms are apt to be very indefinite. Rectal examination is important. Before making a diagnosis one must exclude pneumonia at the right base, which is often mistaken for appendicitis. In case of doubt one should wait a few hours before operating. The rigidity of the abdomen in pneumonia is usually a false rigidity and by

gentleness and patience may be overcome. In cases of worms there may be extraordinary hyperesthesia of the whole abdomen. Typhoid fever, pneumococcus, peritonitis and tuberculous peritonitis must be excluded. Early operation as soon as the diagnosis is made is more important in the child than in the adult. The anesthetic should be stovain as spinal anesthesia or ether by inhalation. The intoxication from chloroform added to the septic poisoning may prove fatal. As little exploration of the abdomen as possible should be indulged in, so as to prevent undue toxic absorption. If there is an abscess it should be opened and drained, and unless the appendix presents immediately it should be left for a second operation. In after treatment the child should be raised into the sitting position by means of slings under the arms. If restless small doses of opium are indicated. The majority of the cases need a drainage tube deep into the pelvis.

T. WOOD CLARKE.

VINCENT, BETH: BLOOD TRANSFUSION: INDICATIONS, METHODS AND RESULTS. (*The Boston Medical and Surgical Journal*, August 22, 1912, p. 239.)

Transfusion is invaluable in making good direct loss of blood from acute hemorrhage; it is more effective in the treatment of severe shock than the older methods, is of much value in the treatment of gas poisoning, and has a marked hemostatic effect in pathologic hemorrhage from such causes as deep jaundice, hemophilia and hemorrhagic disease of the newborn.

In hemophilia transfusion is an effective temporary measure, but does not alter the inherited tendency to bleed.

In hemorrhagic disease of the newborn a disease formerly credited with a mortality of from 50 to 75 per cent., transfusion stops the bleeding, restores the lost blood and apparently transforms a very sick baby into a normal, healthy infant. The amount to be transfused is always considerably under 3 ounces. A baby of 8 pounds is estimated to have a total blood quantity of 6 ounces, and it is thought that the blood loss of an exsanguinated infant is less than one-half its total quantity. The danger of temporizing with measures which in this condition may check the bleeding for a time but cannot relieve the anemia is emphasized.

In secondary anemia not due to loss of red corpuscles from

the body but to some pathologic condition, incurable or not altered by transfusion, transfusion is not so strongly indicated.

From results obtained up to the present time, transfusion is not indicated in purpuric conditions of obscure etiology.

In pernicious anemia, leukemia, acute infections and malignant disease, negative results contraindicate transfusion.

Properly safeguarded transfusion is not a dangerous operation. Embolism, sepsis and hemolysis are of much less frequent occurrence than formerly supposed. According to Crile hemolysis may take place in the test tube and yet the same blood be entirely safe in transfusion.

Though transfusion is a comparatively safe operation it should be considered a measure of last resort and applied only to those cases in which there is a rational basis for its use.

Vincent discusses the various methods of transfusion and their value.

WILLARD S. PARKER.

CECIL, RUSSELL L., AND BULKLEY, KENNETH: A CRITICAL STUDY OF OXYURIS AND TRICHOCEPHALUS APPENDICITIS. (*The American Journal of the Medical Sciences*, June, 1912, p. 793.)

There is a definite and characteristic form of appendicitis produced by oxyuris vermicularis or trichocephalus trichiura. The disease is comparatively common, constituting 15 per cent. of 129 cases of appendicitis in children studied. The typical pathologic changes consist of a catarrhal type of inflammation, and punctures and ulcerations of the mucosa of the appendix by the parasites. The clinical picture is dominated by the exaggeration of the subjective and the lack of the objective signs. Rigidity is frequently absent, and is almost always noticeably less than would be expected from the acute degree of tenderness present. In some instances the parasites or their ova may be demonstrated in the feces. The ideal treatment is appendectomy.

T. WOOD CLARKE.

ZYBELL, FRITZ: EMPYEMA IN INFANTS. (*Monats. für Kinderhk.*, August 3, 1912, p. 93.)

Zybell has written a very thorough monograph on empyema in infants, with a bibliography of over 75 names. His own material numbers 22 cases under one and one-half years; 19 of these cases were under one year. There were 15 deaths among

these 22 cases, which fact clearly shows how very high the mortality is in empyema in infants. The empyema itself, as Finkelstein has shown, gets well, but the infant succumbs to the general infection. Zybell lays great stress on exploratory puncture in doubtful chest signs in infants, and says that puncture cannot be performed too early. This procedure never does harm and may do a great deal of good.

It is interesting to note that empyema may appear and run its course with hardly any rise in temperature. This fact has been noted by Hamburger and Feer. Twenty of Zybell's 22 cases were examined bacteriologically with 18 positive results; 14 cases showed the pneumococcus as the etiologic factor; 3 the streptococcus, and 1 a mixed infection of streptococcus and staphylococcus. One of the cases was shown at autopsy to be tuberculous.

Concerning the treatment of empyema in infants Zybell says that the greatest mortality occurs when a rib is resected. The pus should be evacuated with a large needle or trochar and as much pus withdrawn as possible. If pus reaccumulates, another puncture should be made. The shock of the operation in rib resection is usually fatal to infants.

J. S. LEOPOLD.

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## MEDICINE.

TALBOT, FRITZ B.: ACUTE DUODENAL DIGESTION IN CHILDREN. (*American Journal of Diseases of Children*, June, 1912, p. 398.)

The author reviews the metabolism of bile and urobilinogen and the relation of these substances to the digestion and absorption of fat, then shows the effect on these normal processes produced by obstruction in the flow of bile. He then reports the study of 24 cases of acute duodenal indigestion from the point of view of disturbed physiologic function. The disease occurred as a complication of infectious diseases, such as typhoid or the exanthem in 15 per cent. of the cases. The onset was sudden, with fever and vomiting in 75 per cent., and the liver enlarged in 34 per cent., and tender in 13 per cent. Urobilinogen was absent from the urine in every case where there was complete obstruction to bile and was found in excessive amounts when the



obstruction was removed. The stools were white in 36 per cent., creamy in 14 per cent., clay-colored in 50 per cent. All the cases during obstruction microscopically showed an excess of fat in the form of soaps in constipation, and in the form of both fatty acids and soaps in diarrhea. The treatment consisted in the exclusion of fats and sugar from the diet. Proteins and simple starches may be given. The appetite should be stimulated by nux vomica and large doses of alkalies given to dissolve mucous plug in the bile duct. The prognosis for life is always good.

RICHARD M. SMITH.

FREDGOLD, A. F.: DULL AND BACKWARD CHILDREN. (*British Journal of Children's Diseases*, October, 1911.)

The ratio of dull and backward children is relatively 10 per cent.

*Causes*.—Heredity and environment. (1) General state of health in developmental period. (2) Impressions reaching brain through special senses.

*Varieties*.—Innate dullness, good physical development, healthy, usually children of agricultural laborers, are no more "mental defects" than persons having no taste for music or art. (a) Acquired dullness, backward through lack of opportunity, irregular school attendance, etc. (b) Due to partial blocking of sensory avenues, defective vision or hearing. (c) Defective development through malnutrition or disease.

Proper attention to the individual training of Group 1 will develop them in practical lines, as they are not usually suited for more advanced education. As to Group 2, correction as far as possible of physical errors and "required attendance" at school limited to capacity for development. Fitting the child for the syllabus not the syllabus to the child is wrong.

W. A. MURPHY.

ROSENFELD, J., AND V. RECHTENSTAMM, M. SCHRUTKA: CHRONIC ALBUMINURIA AFTER SCARLATINAL NEPHRITIS. (*Zeits. für Kinderhk.*, July 17, 1912, p. 265.)

Very recently Rosenfeld and v. Rechtenstamm have re-examined 93 out of 174 children which had had nephritis after scarlet in Escherich's clinic during the years 1902-1911. Fifty-two of these 93 cases had shown albumin when discharged from

the hospital. None of these cases proved to have a severe chronic nephritis on reëxamination; 10 of these 93 cases still showed albuminuria; 7 of these 10 cases had positive elements in the urinary sediment, and 1 case had an increased blood pressure.

When the 93 cases were placed in a lordotic position (Jehle) by having them kneel for ten minutes, 8 of these 10 cases showed an increased amount of albumin, and 28 other children of the 93 developed albuminuria.

The authors say nothing about the other 81 children who were not reëxamined and who may have died from a severe nephritis or who may still be suffering from a severe nephritis. On account of this omission the paper loses much of its statistical interest.

J. S. LEOPOLD.

ROLLESTON, H. D.: PURPURA IN INFECTIVE DIARRHEA. (*British Journal of Children's Diseases*, January, 1912.)

A report of observations on 100 cases of severe infectious diarrhea from the records of Victoria Hospital, relative to purpura. Location is on the abdomen and chest. Occurs without edema of extremities in infants under one year. Is usually terminal; prognosis is always grave. In tabulating, a differentiation is made between purpura and the "septic" rashes. In this series no data was obtainable as to possible hemic infection or renal insufficiency.

W. A. MURPHY.

LUCAS, WM. PALMER: CONTRIBUTIONS TO THE NEUROLOGY OF THE CHILD. II. NOTE ON THE MORTALITY AND THE PROPORTION OF BACKWARD CHILDREN IN CASES OF CONGENITAL SYPHILIS FOLLOWED SUBSEQUENT TO HOSPITAL TREATMENT. (*Boston Medical and Surgical Journal*, August 29, 1912, p. 278.)

Out of a total of several hundred cases of congenital syphilis treated at the Children's Hospital, only 60 could be traced. Of these, many are too recent to judge of their final outcome. The results of this preliminary investigation show the need of a further complete study of such cases.

The following points are brought out in the study of the cases tabulated as to age, sex, symptoms, length of treatment and present condition: (1) The early death rate, 21 out of 60 cases. This indicates the need for some system insuring the carrying out of treatment and the continuance of maternal nursing.

(2) The high percentage of backward children, 19 out of 60 cases. Of 16 children of school age, 11 were more or less mentally affected. (3) The treatment was discontinued as soon as the eruption had faded. Whether the responsibility for this rests on the mother or on the medical service must be decided, as the question is primarily one of efficiency.

WILLARD S. PARKER.

POYNTON, F. J.: OBSERVATIONS UPON NERVOUS MANIFESTATIONS IN THE RHEUMATISM OF CHILDHOOD. (*British Journal of Children's Diseases*, February, 1912.)

From the standpoint that the nervous manifestations are the result of either a local infection in the centers or a general toxemia, is discussed the influence of acute rheumatism on the nervous system of children. It is suggested that there are many rather than one rheumatic "poison" varying with the tissues in which the lesions occur. The close association of chorea and rheumatism suggests the latter as the causative factor in the former. Of 500 cases of rheumatism, accepting chorea as such, 122 had heart disease, 28 rheumatic arthritis, 22 dilatation of the heart. Of the remaining, 7 later developed heart lesions; 10 cases had developed chorea following an attack of sore throat. In 19, there was obtained a history of rheumatic fever in the patient's family, active or recent. In addition, 3 of the 15 cases, whose onset was attributed to fright, gave a history of recent exposure to the same infection.

This record supports the contention that the main cause of chorea is rheumatism and even reduces the quest of fright and shock to being interpreted as active factors in producing the actually developed disease in tissues already unstable from rheumatism.

*Pathology*.—Sections from the brain of a rabbit dying with carditis show diplococci in pia mater as do sections from a fatal case of chorea. These diplococci are also shown in the mitral valve of the case of chorea.

W. A. MURPHY.

SAMELSON, S.: THE SO-CALLED "SALT FEVER." (*Monats. für Kinderhk.*, August 3, 1912, p. 125.)

Scheps, Finkelstein and Meyer, and many other observers, have shown during the past few years that a few cubic centi-

meters of an 0.8 per cent. saline solution when given subcutaneously in young infants causes, in a certain number of cases, a rise in temperature to 102°F. or more.

Samelson, writing from Salge's clinic in Freiburg, has attempted to demonstrate that there is no such thing as "salt fever." He maintains that the fever which earlier observers obtained was due to the bacterial toxins which were contained in the water. If freshly distilled water is used in making saline infusions no rise in temperature or other untoward symptoms occur. Samelson, therefore, advises using freshly distilled water in all saline infusions. In this way only beneficial results are obtained. Samelson adds that it has been definitely shown that the fever which was formerly seen after salvarsan injections was also due to the toxins and bacteria contained in the water. This fever was done away with as soon as distilled water was used.

J. S. LEOPOLD.

SHEFFIELD, H. B.: CONGENITAL MYXEDEMA. CYSTIC GOITER WITH FEEBLE MENTALITY. (*Reprint Medical Record*.)

Apparently normal at birth, after a few weeks symptoms began to appear. Examination failed to show a thyroid gland, even a rudimentary form. Improved somewhat on treatment with thyroid substance.

A case of cystic goiter developing in a thirteen-year-old girl, previously apparently normal, associated with appearance of symptoms of enfeebled mentality. General health was good, heart slow and regular, with a large elastic cystic-like swelling on neck. Tumor developed two years previously with first appearance of mental weakness. There was no improvement under thyroid treatment.

W. A. MURPHY.

BASS, MURRAY H.: CHVOSTEK'S SIGN AND ITS SIGNIFICANCE IN OLDER CHILDREN. (*American Journal of the Medical Sciences*, July, 1912, p. 64.)

Chvostek's sign is present in 3.2 per cent. of the poor applying for treatment. The sign becomes more frequent the older the child up to 19.6 per cent., at ten to fourteen years of age. The presence of so great a number of positive cases here in America, where tetany is relatively an uncommon disease, is another argument in favor of considering Chvostek's sign in older



children as distinct from any connection with tetany. The positive Chvostek in an older child, as a rule, means a neuropathic constitution. It seems especially common in children showing vasomotor irritability, and particularly in those suffering from orthostatic albuminuria. Chvostek's sign is easily elicited, and should be more often used as an adjuvant in making the diagnosis of neuropathic children.

T. WOOD CLARKE.

ROLLESTON, J. D.: BLOOD PRESSURE IN DIPHTHERIA. (*British Journal of Children's Diseases*, October, 1911.)

Blood pressure in diphtheria is almost invariably low and bears a direct relation to the severity of the disease. There is, however, no exact relation between blood pressure and pulse rate, though highest blood pressure, like highest pulse rate, occurs in the first week and lowest in the second week. In early paralyses there is a lowering of blood pressure, but in late palsies, *i.e.*, after the second week, a fall in pressure was exceptional. In this observation he fails to confirm Kolossova's, that a fall preceded the occurrence of palatal and ciliary paralyses.

While blood pressure is of assistance in prognosis, it is by no means indispensable.

(1) In 179 cases it was subnormal, 351 per cent., extent and duration having a direct relation to severity of faucial attack.

(2) Highest reading in first week, with lowest in second and return to normal by the seventh.

(3) Reading, in recumbent and erect positions the same, in convalescent cases or recumbent higher if any variation.

(4) Laryngeal cases showed disproportionately high readings. Tracheotomy followed by immediate drop.

(5) Early serum phenomena showed little tendency to vary pressure readings.

(6) Albuminuria was accompanied by fall or no change except in uremia.

(7) Adrenalin therapy may favorably influence symptoms without affecting readings.

W. A. MURPHY.

PONTICACCIA, M.: TINCTURE OF IODIN IN TYPHOID FEVER. (*La Pediatria*, May, 1912.)

The author reports the result of iodine treatment in 17 cases of typhoid. Ages ranged between seven and two years.

Widal reaction positive in all patients, as were all the usual symptoms. In spite of some complications, like bronchopneumonia, cystitis, otitis media and mastoiditis, all the children recovered promptly. Dosage of iodine tincture ranged from 10 to 17 drops daily in sweetened water. No other treatment of any description was given. Diet, liquid of course, consisted of lemonade at first and modified milk later.

C. D. MARTINETTI.

SHEFFIELD, H. B.: MYELOCYSTOCELE. SPINA BIFIDA OCCULTA. (Reprint *Medical Record*.)

(1) A healthy baby with negative history showed a tumor 2 inches in diameter at lower lumbar region, translucent and semi-solid, reducible with great discomfort, evidently from brain pressure, to patient. Rectum was inverted due to paralysis of both levator and sphincter ani, also rt. talipes varus and web-fingers and toes, no motor or sensory disturbance.

(2) Small protuberance over sacrolumbar region in a child suffering with enuresis and blood and pus in urine proved to be a mass of fat covering a spinal cleft. W. A. MURPHY.

TESSIER, P., AND KINDBERG, L.: TUBERCULIN REACTION IN GERMAN MEASLES. (*Bull. de l'Institut. Pasteur*, August, 1911.)

Von Pirquet's test was tried in 178 cases of German measles. In 31 out of the total the reaction was negative at the beginning of the indisposition, while it turned positive during the period of recovery. In many cases the tuberculin employed, when mixed with serum from the pustules, appeared to give a much less definite reaction. C. D. MARTINETTI.

GOLDREICH, ARTHUR: THE CLINICAL DIAGNOSIS OF LATENT HEREDITARY LUES. (*Zeit. für Kinderhk.*, August 4, 1912, p. 406.)

Goldreich, from Hochsinger's clinic in Vienna, has made some very interesting observations on the diagnosis of latent hereditary lues. The history of headache, the presence of hydrocephalus, a saddle nose and the presence of old scars are all valuable diagnostic signs. The Hutchinson triad—the peg-shaped teeth, interstitial keratitis and deafness—occur so rarely that they are not of very great diagnostic importance. The presence of cubital glands, if tuberculous, rachitis and various skin lesions can be

ruled out, is of much value, inasmuch as they were present in from 80 to 90 per cent. of hundreds of cases that were examined. A positive Wassermann reaction, of course, means lues, yet a negative Wassermann does not necessarily rule out latent hereditary lues, inasmuch as one-third of Goldreich's cases gave a negative reaction. The Wassermann reaction, according to Goldreich, should be used as an aid, but should not be considered of too much importance in diagnosing latent hereditary lues.

J. S. LEOPOLD.

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### PHYSIOLOGY.

HEIM, P.: EXPERIMENTS ON DOGS CONCERNING THE ACTION OF CANE AND MILK SUGAR. (*Monats. für Kinderhk.*, August 3, 1912, p. 134.)

In a previous number of the *Monatsschrift* (February, 1912) Saintmont came to the conclusion that milk sugar caused less gastric and intestinal disturbance in dogs than cane sugar. These results were contrary to the observations of Leopold, from Finkelstein's clinic in Berlin, in infants. Leopold showed that diarrhea resulted in 66 per cent. of cases when milk sugar was used and in only 21 per cent. of cases when cane sugar was used. Heim reports in experiments on dogs similar to those of Saintmont. Heim's results are not in accord with Saintmont's. Heim found that, as in infants, milk sugar in dogs causes more disturbance than cane sugar. The same dogs which gained rapidly on cane sugar stopped gaining immediately when the same amount of milk sugar was substituted for the cane sugar.

J. S. LEOPOLD.

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### HYGIENE.

EPSTEIN, ALOIS: EAR-RINGS AND THEIR DANGER, ESPECIALLY AS A SOURCE OF TUBERCULOUS INFECTION. (*Zeits. für Kinderhk.*, August 2, 1912, p. 372.)

Epstein calls attention to the fact that since the washing out of infants' mouths has been prohibited in hospitals, asylums and in private practice, infections of the mouth are very uncommon. Very little has been said about the danger of ear-rings in infants. Infections of all kinds and severe cases of

eczema may result from the wound which has been made during ear piercing in infants. Epstein reports a few cases from the literature in which it has been conclusively shown that tuberculosis may result from ear piercing. He also reports 2 cases which he had observed and which had developed tuberculosis in this same way (infection from ear piercing).

In conclusion, Epstein maintains that ear piercing is a very dangerous procedure and should not be practiced in infants.

J. S. LEOPOLD.

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### THERAPEUTICS.

BATTEN, FREDERICK E., M.D.: THE USE OF CELLULOID SPLINTS IN THE TREATMENT OF CASES OF POLIOMYELITIS. (*The Lancet*, July 13, 1912, p. 80.)

The object of this note is to call attention to the use of celluloid splints in acute and chronic poliomyelitis. They are so light that they can be used to advantage as soon as primary soreness has subsided, and, while they compel fixation of the knee in the extended position, young children usually adapt themselves to this quite readily.

For a child of three a splint for the entire leg weighed but 9 ounces; they can be worn both day and night with comfort and are comparatively inexpensive. While the danger of these splints catching fire is not great, the parents should be informed as to due caution.

WILLIAM LYON.

McILHENNY, PAUL: HYPEREMIC TREATMENT OF ACUTE ANTERIOR POLIOMYELITIS. A PRELIMINARY REPORT. (*Boston Medical and Surgical Journal*, July 18, 1912, p. 87.)

Since June, 1906, the author has treated 5 cases of anterior poliomyelitis as follows:—

The alimentary canal is thoroughly cleansed and the limb or limbs lightly bandaged with cotton. Dry cups are applied intermittently (three minutes with one minute rests) for an hour to both sides of the spine and directly over the posterior processes from the sacrum to the cervical region. This is continued daily until muscular soreness has disappeared and voluntary motion in the affected muscles begins to return; the bandages are then re-



moved and massage begun, while the cupping is continued until the muscles regain their tone. If treatment is begun within two days of the onset, diminution of the muscular soreness may be expected on the fourth day and return of slight voluntary motion on the tenth or twelfth day.

The efficiency of the treatment depends, of course, upon the production of an active hyperemia in the tissues in which the toxin of the disease circulates. While not expecting a cure from this method in all cases, the author believes that if applied before the fourth day of the disease paralysis will, in many cases, be prevented.

WILLARD S. PARKER.

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### INFANT FEEDING.

HOWARD, ARTHUR E.: THE IMPORTANCE OF MILK STATIONS IN REDUCING CITY INFANT MORTALITY. (*Boston Medical and Surgical Journal*, May 23, 1912, p. 773.)

The aim of the milk station is to supervise the feeding, care and home conditions of the well baby. It has been most efficient in lengthening the period of breast feeding by proper care and instruction of the mothers, and in increasing the number of babies breast-fed. Also in furnishing a clean, good milk at a reasonable price to families which otherwise would not get it. The 2,500 to 3,000 home visits made yearly by the nurses on the staff of the Milk and Baby Hygiene Association serve not only for the actual demonstration of bathing, feeding and milk modification, but to discover conditions directly influencing infant mortality.

In the cases of death due to respiratory diseases bad home conditions were found to predominate over good in the rates of 2 to 1; to be about equal in death due to gastroenteric disease, while in case of other diseases good home conditions prevailed over bad in the ratio of  $7\frac{1}{2}$  to 1.

Besides the usual well-recognized causes of infant mortality, the fact is emphasized that the city infant starts with a handicap because the mothers in so many cases must continue work up to within a short time of delivery and resume work very soon after. This fact necessitates the establishment of a system of supervision which should begin with the prenatal period.

WILLARD S. PARKER.

"UEBER SÄUGLINGSERNÄHRUNG." By ERNEST SCHLOSS. Pp. 231. Berlin: S. Karger, 1912.

Schloss's book on infant feeding will be read with a great deal of interest by anyone who has to do with the feeding of infants. His work comes from an infant asylum in Berlin very similar to Finkelstein's.

In the first chapters of his book Schloss reviews the recent German literature on infant feeding. It has been conclusively shown, he says, that human milk is, and always will be, the ideal food for the infant, and especially for the very young infant. Buttermilk, malt soup and Finkelstein's casein milk have been used with very good results for short periods of time, but none of these mixtures, nor other milk mixtures, have come up to expectations for long periods of time as a permanent milk (Dauer Nahrung).

It has been definitely shown by Finkelstein and his school that the factor which causes the chief disturbance in cow's milk is not the casein, nor the fat, nor the sugar, but the salts which are contained in the whey. Whey alone can cause diarrhea in young infants. (The whey of cow's milk contains about three times as much salt as human milk.) The greatest difficulty consists in feeding infants during the first few weeks of life.

During the past few years Schloss has been using a milk mixture which resembles human milk very closely in every respect. He calls this mixture "*whey modified milk*." It contains very little whey and a large percentage of fat. This milk is prepared by taking 1 part of full milk, 1 part of 20 per cent. cream mixture and 5 parts of distilled water. The result is a mixture which contains almost the same percentage of salts as human milk. The only difference is in the diminished amount of potassium. To make up for this, 0.2 gram KCl are added to each liter of milk mixture. This resulting mixture contains the same amount of fat and salts as human milk, but less proteid and less sugar. Proteid in the form of sodium-casein is added to make up this deficit of proteid, and malt sugar and flour to make up the deficit of sugar. The resulting mixture is similar to human milk chemically and in other respects. (Similar freezing point, etc.)

Schloss used this mixture in feeding 200 infants, nearly all in the first few weeks of life. The results were almost as good as with human milk. Of these 200 infants none died of gastrointestinal disturbances. Only 2 of these 200 cases died—1 of empyema and 1 of grippe. Two preparations of this so-called whey modified milk were used—"A" for young infants and "B" for older infants.

*The formula for "A" is as follows:—*

For making 1,000 c.c. (1 liter).

$\frac{1}{7}$  liter full milk.

$\frac{1}{7}$  liter 20 per cent. cream.

35 grams malt sugar.

15 grams flour.

5 grams casein (metrose or plasmon).

0.2 gram Kcl.

$\frac{5}{7}$  liter water.

*The formula for "B" is as follows:—*

$\frac{1}{7}$  liter full milk.

$\frac{1}{7}$  liter 20 per cent. cream.

50-70 grams malt sugar.

5 grams casein.

0.2 gram Kcl.

$\frac{5}{7}$  liter water.

This milk mixture is given in the same amount as breast milk. It tastes the same as breast milk and looks the same.

In the concluding chapters of his book Schloss considers very fully the modern conceptions of "Hospitalismus," summer heat, and hospital infection as applied to regular milk mixtures and this modified whey mixture.

According to Schloss's observations the whey modified milk shows results almost as favorable as can be obtained with human milk, not only as a food for the well infant, but also for the infant with gastrointestinal diseases, exudative diathesis, eczema and spasmophilia. Numerous graphic weight curves accompany Schloss's descriptions.

Whether Schloss's very brilliant results will be confirmed or not by other observers remains to be seen. At any rate, his observations are very interesting and instructive.

JEROME S. LEOPOLD,

# ARCHIVES OF PEDIATRICS

OCTOBER, 1912.

ROYAL STORRS HAYNES, PH.B. M.D.,

EDITOR.

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## EDITORIAL.

### THE PRESENT-DAY POSITION OF THE "MILK STATION."

The milk station of to-day in this country is the result of a process of evolution. As originally conceived it was a place where pure milk was dispensed at cost or less to anyone desiring it. As it was primarily designed to combat infant mortality, the milk was usually modified to set formulæ, suited to the average normal baby, at a given age. There it stopped its work. But, while it did do something, those who watched and studied the situation soon realized that something more was needed, and that something was education of the mother in the care of her baby, of its food and of its home.

In 1911 the City of New York added the milk station to its other weapons in the fight against infant mortality. The pioneer work had been done by private agencies—The Good Samaritan



Dispensary, Nathan Strauss Milk Depots, New York Milk Committee, Diet Kitchen Association, Brooklyn Children's Aid Society and others. The campaign of 1911 in New York is an old story. The infant deaths fell to 111.6 per thousand births as against an average of 135.8 for the preceding five years. The total of deaths was the lowest of any year since 1903. As a result of this campaign the city committed itself to the policy of milk stations, appropriating funds to carry on fifty-five stations. It is a big problem, and the Department is to be congratulated on what it has done, and should receive the support of everyone interested in diminishing the waste of infant lives. Up to October, 1912, the good work of last year had been continued, and approximately 550 less babies had died than in the corresponding period last year.

To-day at the milk station the greatest stress is laid on medical supervision and personal instruction. Every baby enrolled must report regularly for examination by the physician in charge, and every mother is taught by the nurse in her home, under the conditions in which she lives, how to prepare the baby's food. The criticism often made, that the milk station encourages artificial feeding, is not warranted. The greatest emphasis is laid on the necessity of breast feeding, and every effort is made to enable the mother to nurse her baby. The Milk Committee figures show that over 32 per cent. of the babies under one year were breast fed entirely while under observation, and 28 per cent. mixed fed. Over 60 per cent., therefore, received the breast, in part at least.

But this is far from all that is done—once having admission to the home, lessons in the care of the baby, its bath, sleep, airing, clothing, are easily given. There can be no question as to the advantages of home modification of milk instead of modification at the station. The mother is taught something. She is not relieved of her responsibility, but shown how to assume it, and the testimony is universal at the milk stations that there are very few mothers who cannot be taught to prepare the food.

The expense of the modification plant and the staff necessary to do this work is saved, thus removing one of the greatest obstacles to the general adoption of the milk station idea. Home modification in this country is being more and more frequently adopted.

The possibilities of milk stations as local health centers are almost unlimited. The station nurse comes in contact with the expectant mother and prenatal instruction can be well added to the activities of the station. The large proportion of the mortality during the first year which is traceable to prenatal causes can only be attacked through instruction and care during pregnancy. In touch with these expectant mothers the work of the midwives can be watched and violations of the regulations governing their practice can be promptly detected and reported.

It is still claimed by some that pure milk is the most important agent in reducing infant mortality, and the statistics of European cities, especially in France, are cited in proof. The origin of the movement in France was Budin's "Consultations des Nourrissons," which was extended by Dufour for artificially-fed babies, when he established the first of the "Gouttes de Lait." Medical control of the baby is the fundamental principle of these agencies. While they often do not teach home modification or send nurses visiting in the homes, there is a great deal of instruction given to every mother, and the food is carefully regulated for each baby's needs.

Infant consultations, babies' prophylactic dispensaries, baby health stations are being established all over Europe and America, and prevention through education is the element almost universally acknowledged as the essential one. We do not wish to underestimate the value—the imperative need—of pure milk. But the purest milk in the world, alone, will not solve the problem of infant mortality. Ignorance kills more babies than bad milk.

PHILIP VAN INGEN.

## ORIGINAL COMMUNICATIONS.

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### INFANT MILK DEPOTS.\*

BY ROWLAND GODFREY FREEMAN, M.D.,

Adjunct Professor of Pediatrics, University and Bellevue Hospital Medical School,  
New York City.

The terrible mortality of children under one year of age, who are for the most part born into the world with perfect organs and who die only because they are deprived of the essential conditions of good health in infancy, is evidently one that can and should be speedily eliminated, or, at least, materially reduced.

This mortality has been a matter of some concern for many years, and the attention it has received and the study of means of lessening it has already resulted in cutting it down about one-half, so that in our well-administered cities now, instead of finding a loss of one child in every three during the first year, or a mortality of 30 per cent., such as existed in New York some years ago, the city loses less than one child in every six, or, to be more accurate, about fourteen in every hundred born.

These figures, however, scarcely represent the terrible mortality among artificially-fed children among the tenements, for while 80 per cent. of our babies in New York are breast-fed and show a very slight mortality, there is such an overwhelming mortality among the 20 per cent. of artificially-fed babies as to bring the mortality of the whole up to 14 per cent. It is evident, therefore, that the mortality in artificially-fed babies, which is unknown, probably represents something like 70 per cent. It would seem, then, that the reduction in such mortality is not so much a matter of a change of environment, because breast-fed babies do fairly well in a poor environment, as it is a matter of feeding.

It is a well-established fact, from our experience in institutions, that there are some babies, at least in some institutions, who cannot be brought up on any artificial food. These children need breast milk, and if our institutions could arrange to supply a moderate amount of breast milk to very young babies that will not thrive on artificial food, their mortality would be greatly reduced.

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\* Read at Conference on Infant Hygiene, at Philadelphia, on May 22, 1912.

Under the best conditions the babies are very rare that cannot be successfully fed on artificial food, and wet-nurses are seldom resorted to in private practice by resourceful pediatricians.

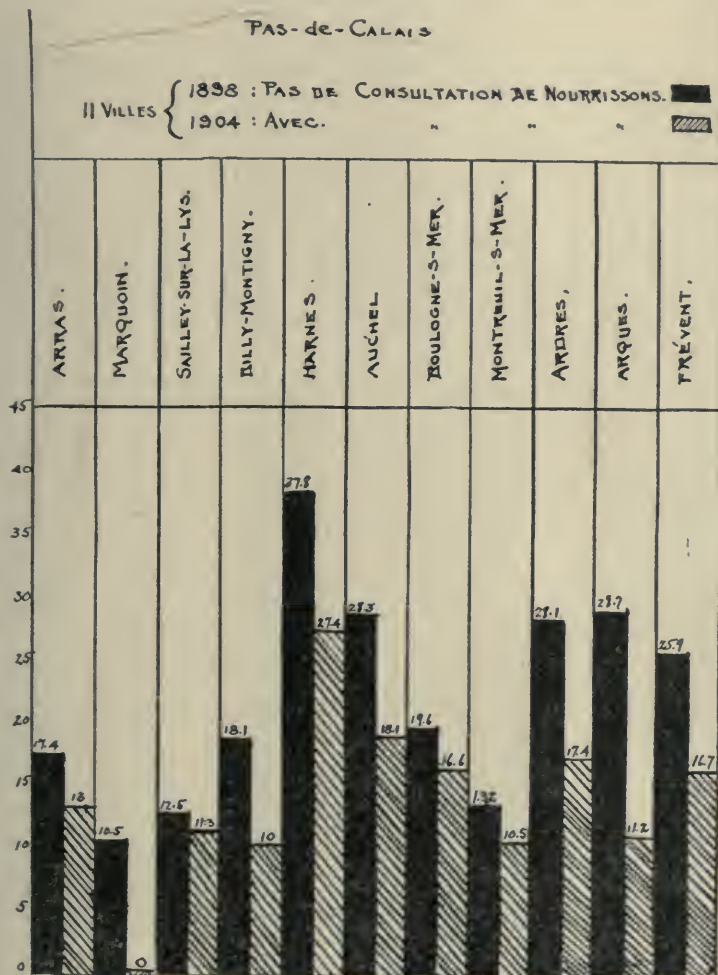


FIG. No. 1.—In order to ascertain the efficiency of the establishment of milk depots, the mortality in the towns having milk depots in 1904 was compared with that of the same towns in the year 1898, and, as seen in this chart, the mortality in all the eleven towns containing milk depots showed some diminution.

In private practice, where few babies are breast-fed, and then only for the first three or six months, not one in 150 die during the first year, as against the infant mortality of 21 in 150 in New



York City. So that this enormous mortality would seem theoretically to be largely controllable by supplying these babies in the

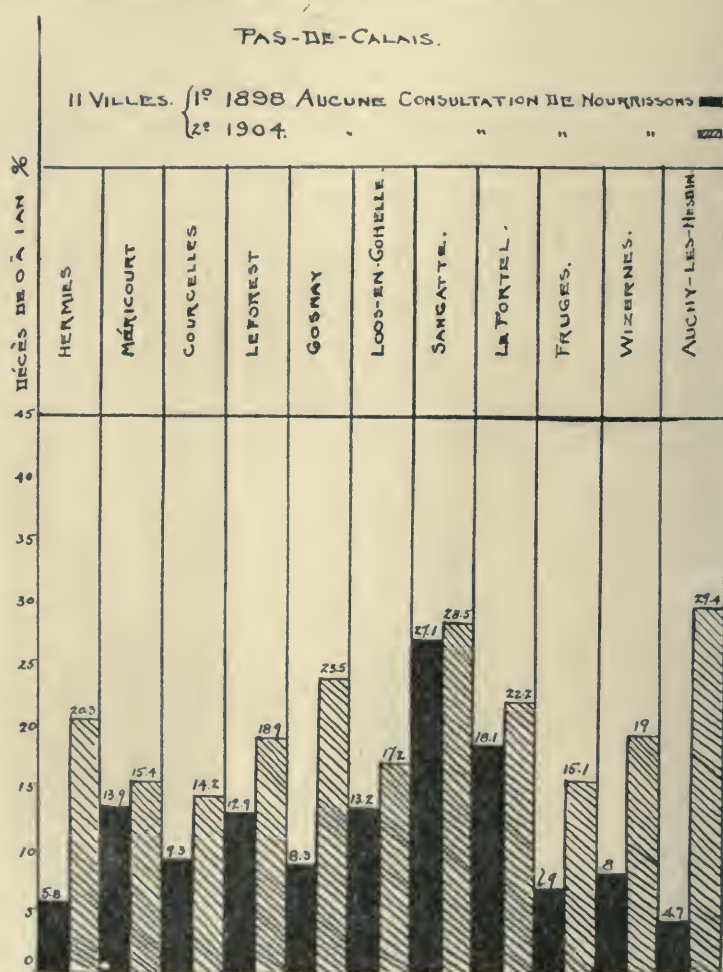


FIG. No. 2.—In order to be sure that this was not due to other conditions than the milk depots, the mortality in the same year of these eleven towns was compared with eleven neighboring towns in which no milk depots were established, and it was found that in the last eleven towns there was an invariable increase in mortality in 1904 over 1898.

tenements with proper food, and, as we shall see later, the result of doing this has been remarkable.

Several different organizations have been used for the reduction of infant mortality, and in France, where, on account of the

low birth rate, infant life is more vital to the prosperity of the country, and vigorous means have been taken to lessen infant mortality, the first organizations of this sort were established.

The first milk depot was established in Paris by Dr. Variot in 1892, one year previous to the establishment of the Straus milk depots in New York. Other institutions for the accomplishment of the same purpose have been organized in France, where there are three types of such institutions — the *Mutualité Maternelle*, intended to help the mothers who are nursing their babies, as well as to assist in the intrauterine development of the child and to assist the mother, if necessary, during the

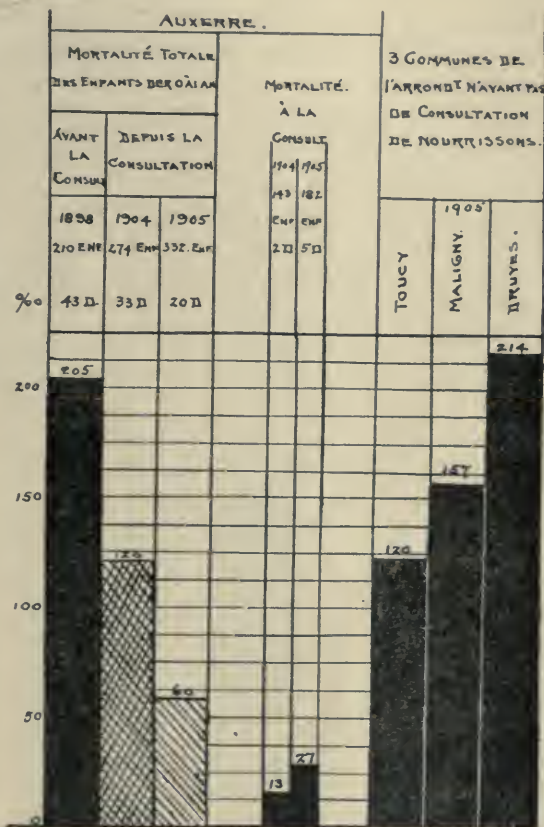


FIG. NO. 3.—In Auxerre, in 1898, with no milk depots, 205 infants under one year of age of every 1,000 born died; in 1904, with some milk depots, 120 died; while in 1905, with a considerable increase in milk depots, only 60 died. The mortality at the same time in infants fed at the milk depots was considerably less—only 13 per 1,000 in 1904 and 27 per 1,000 in 1905; while in this chart these results are compared with other towns having no milk depots, giving a mortality of 120, 157 and 214 per 1,000.

first months of the child's life while she is nursing it; the Consultations de Nourrissons, which are attached to the obstetrical clinics and are intended to encourage the mothers to nurse their children, if possible, and, where necessary, to furnish a proper

substitute for breast milk; and the Gouttes de Lait, which are simply milk dispensaries where, while nursing is encouraged, proper advice concerning artificial-feeding is given.

The benefit derived from all these institutions has been so evident that their organization has spread rapidly, and milk depots may now be found in most of the countries of the world—in France, Spain, Russia, Sweden, Italy, Switzerland, Germany, England, as well as in South America and Africa. New York City now has some seventy-five milk depots, fifty-five of which are under the supervision of the Department of Health.

The first milk depots were all, I believe, organized through private philanthropy, but in recent years municipalities have undertaken their organization. In this country I have personally felt that this work was safer in the hands of private philanthropy, but I believe that those now organized under our New York Health Department will, for the present at least, be free from political interference.

Now as to organization. The ideal milk depot, to my mind, is one equipped with rooms for preparing the milk, pasteurizing it in the nursing bottles and distributing it from depots very near the home of the mother at cost, or to the destitute free. The ideal equipment for accomplishing this would be a large plant for preparing and pasteurizing the milk, with a consulting room and dispensing room attached and with refrigerator wagons for transporting the milk. There should also be a number of sub-stations for distribution and consultation, with still more sub-stations for distribution only. Each of the consulting stations should be provided with a physician, who would spend certain hours there each day, and a nurse, who would spend all her time on the work in the depot and the homes.

This scheme provides the most economical method of preparing and distributing the milk. It provides consulting rooms, where the mother may take her baby once a week for weighing and for advice, as well as nearer distributing stations, where the milk may be obtained on other week days without going as far as the consulting station.

It was estimated that for New York an endowment of \$5,000,000 would be necessary to establish and support such plants in all boroughs, and although efforts were made to obtain this endowment, no philanthropist could be found who was willing to furnish the capital.



The Straus milk depots endeavored, in a limited way, to carry out these ideas. They have used certified milk which has been pasteurized in the nursing bottles and which was distributed with a sterile nipple for each bottle. They have not accomplished all that they might, because, in the first place, there are too few of them, and not a sufficient equipment of doctors and nurses.

Although I believe the ideal equipment is what should be provided, I am convinced that very efficient work can be done with less equipment, where the funds are limited, when certified milk is distributed and clinics are held by physicians, and nurses are provided who are active in the milk depots and at the homes. Thus the New York Diet Kitchen Association which, with a small income from subscriptions and endowment, was doing a very limited work in dispensing milk to babies and invalids, has recently rapidly expanded its work through a policy

of charging those who can afford to pay, so that during the past year, with an income of some \$82,000, \$45,000 of which was contributed by the mothers who bought the milk, they have been able to dispense more than a million quarts of milk from nine stations, and their results have been wonderfully good. Consultations with physicians are held, and trained nurses have been attached to some of the depots and will soon be attached to all. The mortality in the cases treated at these depots has been extremely small. Of 2,421 babies under their care between June and October last, four months, including

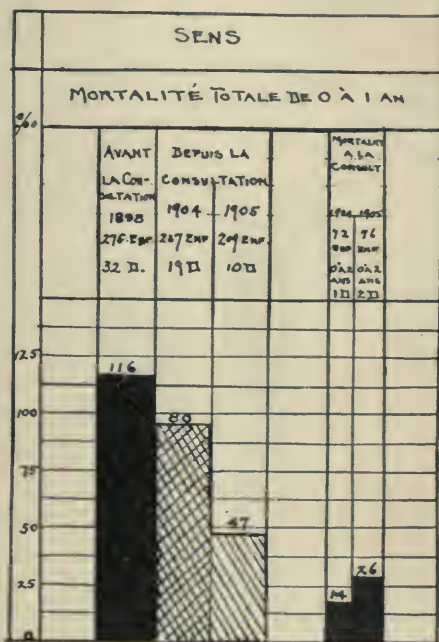


FIG. NO. 4.—In Sens the mortality before the establishment of milk depots, in 1898, was 116 per 1,000. This fell in 1904 to 80 and in 1905 to 47; while the mortality among the children fed at the milk depots was 24 in 1904 and 26 in 1905.



the summer months, they report only thirty deaths from all causes, a mortality of 12-10 per cent. for these hot summer months. Their results, I believe, could not be very materially improved were the milk dispensed pasteurized in nursing bottles.

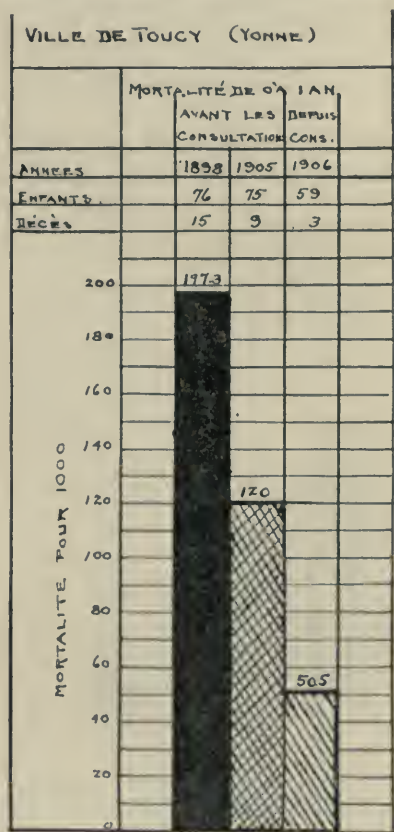


FIG. NO. 5.—In Ville de Toucy, while before the establishment of milk depots the mortality of infants under one year was 197.3, it fell in 1905 to 120 and in 1906 to 50.5.

On the other hand, I still believe that where funds are available the scheme that I first mention should be carried out.

As to the results of milk depots in lowering mortality, it has been found that where they are generally established so as to supply all the babies that need their help a reduction of about 60 per cent. is obtained. This has been repeatedly demonstrated in France, and the accompanying charts show similar results from different sorts of milk charities both in France and in this country.

Excellent illustrations of the efficiency of infant milk depots on mortality are the results of the establishment of milk depots in the villages in the Province of Bouches-du-Rhone in southern France, as shown graphically in charts by P. Budin.\*

The general movement for the establishment of milk depots in this province was begun in 1903. In order to ascertain the efficiency of this establishment of milk depots, the mortality in the towns having milk depots in 1904 was compared with that of the same towns in the year 1898, and, as seen in Chart No. 1, the

\* "La Mortalité Infantile dans les Bouches-du-Rhone," by Pierre Budin, *L'Obstétrique*, July, 1907.

mortality in all the eleven towns containing milk depots showed some diminution. In order to be sure that this was not due to other conditions than the milk depots, the mortality in the same years of these eleven towns was compared with eleven neighboring towns in which no milk depots were established (Chart No. 2) and it was found that in the last eleven towns there was an invariable increase in mortality in 1904 over 1898.

These figures encouraged the expansion of this work, so that in 1905 a very much larger number of infants  $\%$  were fed, and with this a greatly diminished death rate was noted.

Thus, in Chart No. 3, it will be seen that in Auxerre in 1898, with no milk depots, 205 infants under one year of age of every 1,000 born died; in 1904, with some milk depots, 120 died; while in 1905, with a considerable increase in milk depots, only 60 died. The mortality at the same time in infants fed at the milk depots was considerably less—only 13 per 1,000 in 1904 and 27 per 1,000 in 1905; while in this same chart these results are compared with other towns having no milk depots, giving a mortality of 120, 157 and 214 per 1,000.

Again, at Sens (Chart No. 4) the mortality before the establishment of milk depots in 1898 was 116 per 1,000. This fell in 1904 to 80, and in 1905 to 47; while the mortality among the children fed at the milk depots was 14 per 1,000 in 1904 and 26 in 1908.

Again, in Ville de Toucy (Chart No. 5), while before the es-

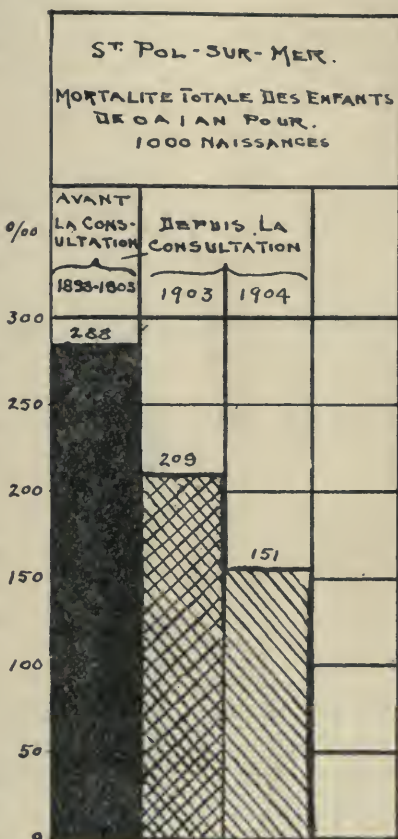


FIG. No. 6.—At St. Pol-sur Mer, a mortality of 288 before the establishment of milk depots was reduced to 151.



the establishment of infant milk depots has been noted by Getty in Yonkers (Chart No. 8), where milk depots were established in 1895. For three years previous to the establishment of milk depots the deaths of children under five years of age averaged 162 per 1,000. In 1896 they were reduced to 135, while the deaths for

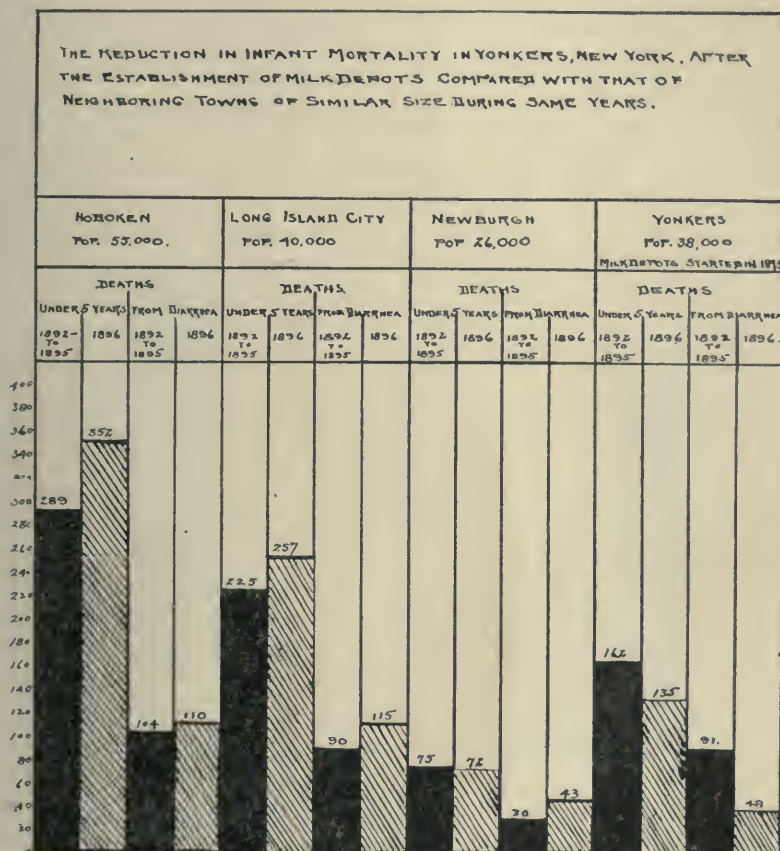


FIG. No 8.—Comparison of the death rate in Yonkers before and after the establishment of milk depots with that of other neighboring cities of similar size without milk depots.

the three years previous to the establishment of these depots from diarrhea had been 91, they were reduced in 1896 to 48. During the same period the mortality in three neighboring towns of similar population showed usually an increase in 1896 over the period of 1892-1895 for the class under five years of age, and also from diarrhea.



In New York a diminution of mortality following the establishment of milk depots also occurred, although there were other factors that were active at that time, and this reduction cannot

be attributed entirely to milk depots. The mortality of infants under one year, before the establishment of milk depots in 1891 (Chart No. 9), was 244, while in 1902 it was reduced to 158, and in 1906 to 144. They reached, however, only 3,500 out of a population of 205,000 infants under two years.

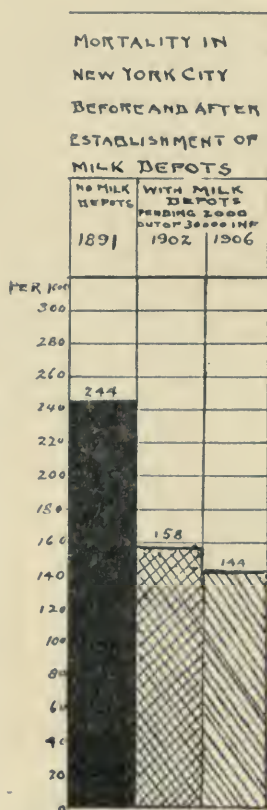


FIG. NO. 9.—In New York a diminution of mortality following the establishment of milk depots also occurred. The mortality of infants under one year, before the establishment of milk depots in 1891, was 244, while in 1902 it was reduced to 158 and in 1906 to 144.

The best illustration of the benefit of milk depots in New York City is the result of observations carried on by the Rockefeller Institute under the supervision of Drs. Park and Holt on the condition of children fed in the tenements on different sorts of food, as seen in Chart No. 10. The mortality of seventy children fed on condensed milk during the summer was 20 per cent.; while of those fed on store milk it was 19 per cent.; on good bottled milk, 9 per cent.; while the infants fed from milk depots showed a mortality of only 2.7 per cent.

It is evident from the results indicated in the foregoing figures that if milk depots could be established in New York with a sufficient number of distributing points, so that each tenement-house mother could readily obtain proper milk for her baby, a reduction in infant mortality similar to that shown in certain towns in France should be accomplished; that is, a

reduction of about 60 per cent., so that the 17,000 deaths under one year should be reduced by 10,500, or to 6,500, while a considerable saving in the lives of children between one and two years of age would also result, and that while every small movement of

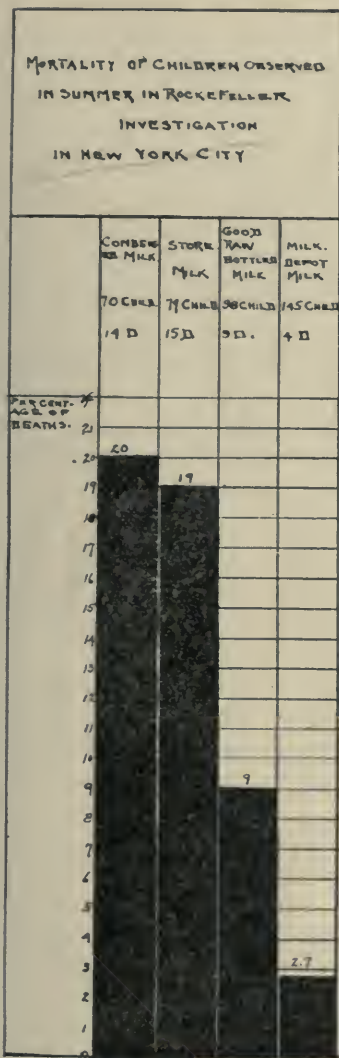


FIG. NO. 10.—The best illustration of the benefit of milk depots in New York City was the result of observations carried on by the Rockefeller Institute under the supervision of Drs. Park and Holt on the condition of children fed in the tenements on different sorts of food. The mortality of 70 children fed on condensed milk during the summer was 20%; while of those fed on store milk it was 19%; on good bottled milk, 9%; while the infants fed from milk depots showed a mortality of only 2.7%.

this sort will have an impression, no very evident life-saving can be brought about, or useful lesson for other communities taught, unless such depots are established on a large scale.

It is interesting to ascertain, if possible, whether this decrease of 60 per cent. is owing to the dispensing of a clean, healthful milk or to the education of the mothers, which is a part of the function of milk depots. We, fortunately, have had in New York an opportunity of ascertaining fairly accurately what can be done by education alone, for the Association for Improving the Condition of the Poor in our city has always held that the poor should be helped by teaching them to help themselves and not by establishing plants to help them, and their attitude was probably one reason why it was impossible to obtain a large bequest for the establishment of milk depots.

To show the effect of education alone, this Society equipped one Assembly District in New York with ample doctors and nurses, who visited the homes, established clinics at a central depot, and instructed the mothers in the essentials for the preservation of health in their children and the details of the preparation of the milk, allowing them, however, to purchase the milk

at the grocery. To what extent they directed the mothers to good milk supplies I do not know; but from their results I imagine that not much was done in that way. An indication of the amount of work they did can be shown by the fact that they visited more than 116,000 families, where they gave instruction in feeding, cooking, clothing, fresh air, nursing and general care.

The mortality in this Assembly District, as compared with the rest of the city, showed that while the total deaths from all causes in the entire city increased 4 per cent., in this Assembly District they diminished 11 per cent.; while the deaths from diarrhea in the whole city increased 1 per cent., in this Assembly District they diminished 10 per cent.; and the total deaths from diarrhea under five years, which in the whole city increased 3 per cent., in this Assembly District diminished 12 per cent.; so that we get a diminution in mortality in this Assembly District of about 15 per cent. We may, therefore, conclude that the educational features of milk depots will not give us much more than a 15 per cent. reduction in infant mortality, but we have already seen that milk depots with education produce a 60 per cent. reduction in mortality, so we are left to credit good milk with about 45 per cent.

These figures, while not accurate, seem to me significant, and I believe the claim of philanthropists, that education, not milk, is necessary, is false. The poor need education, but they need clean, healthful milk much more.

*211 West Fifty-seventh Street.*

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THE EUCALYPTUS TREATMENT OF SCARLATINA AND MEASLES.—Kretschmer (*Münch. Med. Woch.*, August 13, 1912) states that this treatment did not originate with Milne, as is erroneously believed. It was taught as far back as 1890 by Curgenvén, who used eucalyptol both externally and internally, and even as a common disinfectant of apparatus and bedding. The author has used the treatment extensively in Strassburg according to the directions of Milne, and cannot endorse it as preventing complications. In 77 cases of scarlatina there were complications in one-half of the patients. In not a few cases these supervened after the completion of the treatment. In a control series of cases before the treatment was adopted there were fewer complications.—*Medical Record.*

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## ACUTE YELLOW ATROPHY IN A CHILD THREE YEARS OF AGE.\*

BY FRANCIS HUBER, M.D.,

Professor of Clinical Medicine, Medical Department, Columbia University.

Jaundice in the newborn, usually of a benign character, is of frequent occurrence. It may manifest itself in a yellowish tinge of the skin, which physiologically follows the hyperemia of the integument in the first few days after birth. Secondly, it may be due to the presence of bile pigment in the skin, due probably to changes in the hepatic circulation. It may be evident at birth; more commonly, however, it occurs two or three days later. The prognosis, as a rule, is good. In the so-called "icterus neonatorum," regarded as a physiologic rather than a pathologic condition, the urine and stools are not changed in character.

Much speculation regarding its origin has been indulged in and many theories now disproved or shown to be unreasonable, have been promulgated. At the present time the condition is regarded as hepatogenous rather than as hematogenous in origin.

In a recent work from the Research Laboratory, Board of Health, New York City (*American Journal of Diseases of Children*, May, 1912), Dr. A. F. Hess presents a study of icterus neonatorum by means of the duodenal catheter. Some of the more prominent theories and recent views are given. As the result of carefully conducted experiments and findings, no new theory is advanced, but the following summary is presented: "Tests by means of the duodenal catheter show that bile is very rarely excreted during the first twelve hours of life; it was obtained but once in the course of fifty-two tests.

"Bile excretion during the subsequent twenty-four hours is variable; in cases of marked jaundice it is profuse; in cases not jaundiced it is scanty or absent.

"The function of excretion gradually becomes fully established during the first week or ten days of life.

"Where jaundice manifests itself, it precedes the excretion of bile into the duodenum.

"Secretion of bile varies within wide limits. In general, it is marked when the jaundice is marked.

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\* Read by title at Meeting of the American Pediatric Society, May, 1912.



"The occurrence of jaundice results from a defective correlation of excretion and secretion. It is generally caused by the inability of the rudimentary excretion to cope with the sudden profuse secretion of bile."

The article concludes as follows: "The reason why jaundice appears in the first days of life is because at the time when excretion has incompletely assumed its function throughout the body, in the liver as well as in other organs, for example, in the breast and in the kidneys, a sudden flood of bile is poured into the passive excretory ducts and gains access to the hepatic circulation."

The mild type referred to above must be differentiated from the more serious conditions, the result of congenital syphilis, malformations of the biliary ducts or septic conditions originating in the umbilical stump.

In certain types of septic infections in the newborn, described as "Buhl's disease," extensive fatty degeneration of the parenchymatous organs is found postmortem. Such cases must be regarded as unusually severe types of sepsis, in which particular symptoms are especially prominent.

In older children, if we except the cases due to alcohol and gall bladder troubles, the same causes are effective as in adults. It is not our object to discuss fully cases of jaundice following duodenal catarrh with its various causes, the type due to emotional disturbances or the epidemic variety. Occasionally catarrhal jaundice is seen in infectious diseases, as pneumonia or typhoid fever. Osler says the nature of acute catarrhal jaundice is unknown. It may probably be an acute infection. Anomalous cases are, now and then, encountered.

Among the rare instances are the cases "met with in various conditions of unknown, but more or less obscure infective nature, variously designated as epidemic, infective, febrile, malignant jaundice, icterus gravis, Weil's disease, acute yellow atrophy." (Osler.)

There are all grades of transition between the simple catarrhal jaundice and the grave, destructive icterus, so-called acute yellow atrophy.

Acute yellow atrophy, as defined by Osler, is understood to represent jaundice associated with marked catarrhal symptoms and characterized anatomically by extensive necrosis of the liver cells, with reduction in the volume of the organ.

A. O. J. Kelly says: "Acute yellow atrophy of the liver is an acute and widespread autolytic necrosis of the liver cells characterized clinically by jaundice, reduction in size of the liver, and toxic disturbances of cerebation, proceeding to a fatal issue."

In text books it is stated that simple catarrhal jaundice lacks the features of general infection. Weil's disease, on the other hand, is a type of infectious jaundice in which fever, enlargement of the liver and spleen, nephritis and muscular pain accompany the icterus. These cases are usually of a benign character terminating in recovery. "From icterus gravis and acute yellow atrophy only the course of the disease and the absence of destruction of the liver cells can fully differentiate these benign cases; there is, in fact, a gradual merging of the types and no distinct border line."

In hypertrophic cirrhosis the symptoms of a profound icterus gravis may develop, with all the clinical features of acute yellow atrophy, including the presence of leucin and tyrosin in the urine, and convulsions. (Osler, fourth edition, p. 551.)

In cases of hypertrophic cirrhosis, which eventually end in atrophy, we should not be surprised to see acute yellow atrophy supervene, but that the latter should develop in the florid period of hypertrophy seems almost a physical impossibility. In a recent article (*Münch. med. Woch.*, December 26, 1911) Auerbach describes a case readily diagnosticated during life.

Acute yellow atrophy is rare. The best recent study of the subject is by F. W. White (*Boston Medical and Surgical Journal*, 1908, Vol. CLVIII., p. 729).

J. Phillips (*American Journal Medical Society*, February, 1912) reports a case with autopsy in a child five years of age.

Rolleston has collected 22 cases occurring within the first ten years of life. One of our members, Dr. A. H. Wentworth, reported a case in a child of five years (*Transactions of American Pediatric Society*, Vol. XVII., p. 140). The cause of the disease is unknown; cases have been observed after various acute infectious diseases and in syphilis. It has followed acute alcohol poisoning, the ingestion of mushrooms and sausages, prolonged chloroform narcosis and phosphorus poisoning. It has occurred in livers of a normal type or when affected by chronic processes, such as cirrhosis or passive congestion, cholangitis.

A study of the literature and pathologic conditions and findings leads inevitably to the conclusion that the designation of

acute yellow atrophy, as well as icterus gravis, comprises a series of diverse disorders that exhibit more or less superficial resemblance. Cases due to syphilis, septicopyemia, puerperal eclampsia, phosphorus poisoning, delayed chloroform poisoning, etc., can be separated from the main group, but the definite etiologic factor of a large proportion still remains to be determined.

It is greatly to be regretted that the history of the case reported below is imperfect. Unfortunately no data were obtained in a second case, in a girl sixteen months of age, admitted to my service at Gouverneur Hospital October 2, 1910. This child was brought in on the ambulance in profound coma, intensely jaundiced and died a few hours later. Only a portion of the liver was obtained postmortem. Dr. B. Schwartz (associate pathologist) reported changes similar to those found in acute yellow atrophy.

Gussie K., three years of age, admitted to Beth-Israel Hospital (children's ward) November 26th, 12 M.; died November 26th, 10.50 P.M.

*Present History.*—Began gradually two weeks ago with slight jaundice, restlessness, white stools and apathy. Has had a low grade temperature for the last few days.

On day before admission it was noticed that the child could not see. A few hours later projectile vomiting set in and child became stuporous; twitchings of left hand were noticed. Child was brought to hospital in coma.

*Physical general condition* very poor, complete coma, respirations irregular.

*Skin* deeply jaundiced.

*Eyes.*—Pupils irregular, sclera jaundiced.

*Heart.*—Sinus irregularity.

*Liver.*—Dullness 1 inch below the free border of the rib (four fingers below free border four days ago).

*Extremities.*—Knee jerks exaggerated.

*Clinical.*—Lumbar puncture: 25 c.c. clear fluid under pressure withdrawn. No albumin present.

*Urine* shows large amount of albumin, no casts. Bile present.

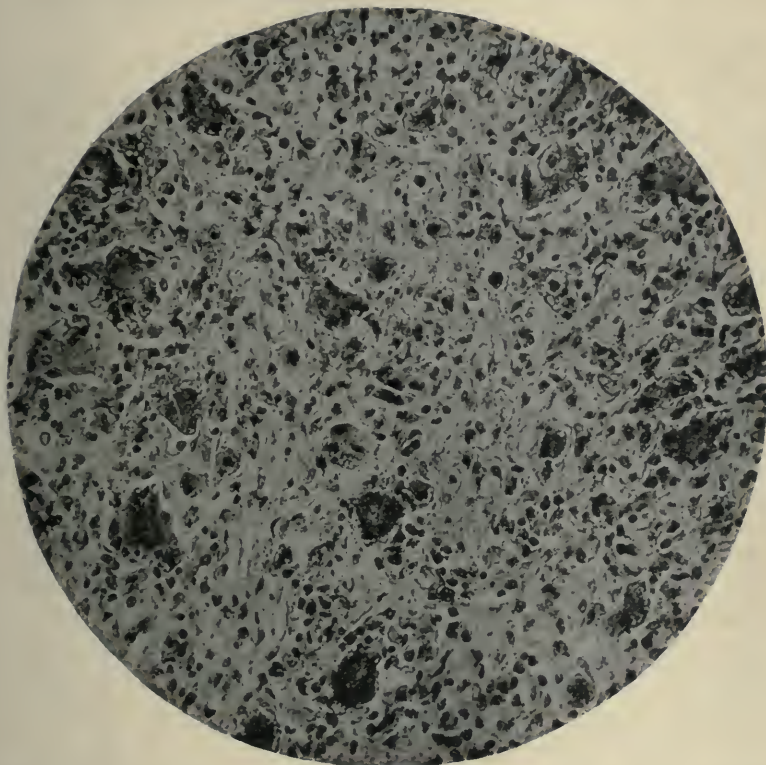
*Blood.*—White blood corpuscles, 19,000—70 per cent. polynuclears.

*Temperature.*—97°-98° F.: pulse, 88-104; respiration, 30.



The profound coma, intense jaundice and rapid reduction in the size of the liver led to a probable diagnosis of acute liver atrophy.

Sincere thanks are herewith tendered to our pathologist, Dr. Eli Moschcowitz, for the postmortem and pathologic report.



Cross section of liver (magnified  $\times 170$ ), showing complete loss of normal histological arrangement, and extensive formation of new connective tissue. A number of deformed liver lobules are seen, the cells of which show some parenchymatous and marked fatty degeneration. A few isolated liver cells are also interspersed in the connective tissue. The connective tissue is infiltrated with round cells and a few polymorphonuclear leukocytes.

Partial autopsy only permitted. Lungs and heart not removed.

*Liver.*—Enlarged, yellowish red in color, surface smooth, edges sharp. On section firm, surface smooth; color pale red with greenish tinge. Surface presents a “marmorites” appearance, each lobule being surrounded by a yellowish narrow zone.

*Gall bladder* normal in size, filled with green fluid bile. Ducts free.



*Stomach* normal.

*Spleen* 6 x 3 x 1½ inches. Surface smooth. On section, firm, reddish brown in color, malpighian bodies enlarged and prominent.

*Kidneys* enlarged, surface smooth, capsule strips easily. On section, light red in color, cortex thinned, markings cloudy. Bases of papillæ slightly congested. Pelvis free.

*Pancreas*.—Firm, yellowish gray in color. On section smooth, lobules in places indistinctly outlined; in these areas the organ is a trifle softer than normally.

*Intestines*.—Peyer's patches very prominent, otherwise normal.

*Mesenteric glands* much enlarged; smooth, firm, greyish in color.

*Anatomic Diagnosis*.—Icterus, acute congestion and fatty degeneration of liver. Splenic hyperplasia; acute parenchymatous degeneration of the kidneys. Status lymphaticus.

*Microscopic Report*.—*Liver*.—The entire histologic arrangement of the liver is absent. Instead, we find a diffuse replacement of the liver structure with fibrous tissue in which the remains of the liver trabeculæ are imbedded. The majority of these trabeculæ have retained their original conformation, while others are merely represented by irregularly arranged groups of cells. Isolated epithelial cells or groups of two or three are common. The majority of the liver cells stain well, others stain poorly, the nuclei being faint and poor in chromatin. The cell bodies are granular and merely contain fatty globules. In many cells the fat globules entirely replace the protoplasm. Histologically, the relation of the degenerative processes to the liver lobule cannot be determined with any accuracy, but it appears as though the peripheral portions of the lobules in the neighborhood of Glisson's capsule and the sublobular veins show a greater preservation of the liver trabeculæ than the central portions. The connective tissue consists of fine fibrilla in which the numerous red blood cells, round cells and cells resembling plasma cells, are abundant. Collections of round cells are common and usually occur near the capsules of Glisson.

The capsules of Glisson are well preserved and are infiltrated with a moderate number of round cells. The vein and artery show nothing abnormal. The bile ducts are well preserved and are empty. Newly formed bile ducts are numerous, especially

in or near the capsules of Glisson. The central veins are nearly all obliterated. There is a diffuse biliary pigmentation in the connective tissue and in the remains of the liver trabeculæ.

*Spleen.*—The malpighian bodies are very large and have a large chyme centrum. The splenic veins are enormously dilated and the lining endothelium is much swollen. The trabeculæ are not increased in number or size.

*Kidneys.*—The cells of the convoluted tubules are swollen, poorly demarcated and coarsely granular in appearance. The nuclei stain faintly. The lumina contain a moderate amount of cellular and granular débris. The glomeruli are congested and do not entirely fill the capsule; the resulting spaces contain small amounts of granular material. There is moderate congestion, especially in the cortex. Papillæ and pelvis normal.

*Pancreas.*—Considerable area of autodigestion, otherwise normal.

*Intestines and stomach* normal.

*Mesenteric Glands.*—Diffuse hyperplasia.

*Diagnosis of Acute Yellow Atrophy.*—In the early stage, there are no characteristic symptoms to arouse suspicions that we are dealing with more than an ordinary catarrhal jaundice. The development of nervous symptoms should put us on our guard and lead to a more careful examination of the urine for the presence of leucin and tyrosin. As the case develops the jaundice becomes more pronounced; vomiting persists, with possibly hematemesis or the appearance of purpura. Headache, noisy delirium, restlessness, followed by coma and possibly convulsions, quickly lead to a fatal termination. In the early stage the liver is slightly enlarged and tender. Death may occur before the liver diminishes in size.

Lindsay S. Milne (*Archives of Internal Medicine*, November 15, 1911) says, "Acute yellow atrophy, as is well known, is an extremely widespread rapid necrosis of the liver. The term atrophy is therefore a misnomer."

He believes it to be more common than usually so considered, for in the past its conception has been based on an altogether too classic picture from the clinical and pathologic view. There is a wide latitude in its duration, clinical type and pathologic appearance depending on the degree of hepatic destruction.

Milne further states, in children in particular, a protracted course is the rule. In the article referred to above, subacute

liver atrophy is fully discussed. An additional case with complete pathologic findings is reported.

Ten cases have been observed by this author of which number five have been reported in the *Journal of Pathology and Bacteriology*, Cambridge, 1909, Vol. XIII., p. 161.

"Subacute atrophy, like acute yellow atrophy, is not a real atrophy, but the result of a necrosis and the subsequent inflammatory repair. As in the acute cases, the necrosis is more or less rapidly accomplished, and the longer duration of life in the subacute, or recovery in the chronic cases, depends largely on the amount of liver destruction and its recuperative power."

From his careful studies Milne adds: "In conclusion, one can trace a direct connection between acute yellow atrophy, subacute atrophy and cirrhosis of the liver in all its types, the difference in each depending on the extent and rapidity of accomplishment of the destruction of the liver."

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INFANTILISM AND THE TESTICLES.—In the course of an able paper on infantilism, which gives a good account of the Lorrain and other types, Mathilde de Biehler, in the *Archives de Med. des Enfants*, for January, 1912, draws attention to the work of Ancel and Boirin. These have shown that, in the testicle, there are certain interstitial cells, scattered between the seminiferous canaculi, which are the source of the internal secretion so necessary to the organism. These cells, which Regard and Renike have called the interstitial glands of the testicle, have no concern with spermatogenesis, but are none the less indispensable for the proper development of the body. They are found developed while the seminiferous canals are as yet in an embryonic stage; they are not affected by diseases which arrest spermatogenesis and cause testicular atrophy; they are not affected when vasectomy is performed, or when obliterative epididymitis occurs. They are found well developed in some cryptorchids, who have no spermatogenesis. Two types of cryptorchids are recognized: in one both testicular elements are absent (these are of course sterile, but also suffer from testicular infantilism); another in which only the spermatogenic tissue is absent. These preserve the interstitial gland, and, though not fertile, possess the usual male secondary characters.—*The Universal Medical Record*.

## THE VARIOUS MENINGITISES: THEIR DIAGNOSIS AND TREATMENT.\*

BY WILLIAM PALMER LUCAS, M.D.,

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During the past few years the various meningitises have come into more special notice on account of the various specific serum treatments which have been found for the various forms. Previous to the discovery of anti-sera for cerebrospinal meningitis, these cases were practically hopeless, only a very small percentage recovering, the percentage depending upon the virulency of the organism and the resistance of the patient rather than any form of treatment that was instituted. Since, however, workers in Germany and Flexner working in the Rockefeller Institute in this country have perfected specific anti-serum for the meningococcic form of meningitis, the different forms of meningitis have received considerable attention, both from an experimental standpoint and also by the clinician in testing out the value of different forms of specific anti-serum treatment. It is with the hope of bringing some of these investigations and their results before you that I wish to take up the various meningitises, their diagnosis and treatment.

We may define meningitis as any inflammation of the meninges, the brain, or the cord, or both being involved. There are certain points in common in the diagnosis of all of the acute affections of the meninges. With the exception perhaps of tuberculous meningitis, they all have a rapid onset, usually with pronounced cerebral symptoms, such as headache, vomiting, more or less rapid rise in temperature, at times a slow pulse. Any of the forms may be ushered in with convulsions; and convulsions during the course are common in all forms, though not by any means always present. In the physical examination of these cases there are certain points in common in all the forms—more or less apathy, mental cloudiness to absolute unconsciousness, stiffness of the neck, considerable pain on manipulation, a stiffness in extreme cases developing into rigidity and retraction, giving in the most extreme cases opisthotonos, reflexes usually ex-

\* Read before the South Boston Medical Society, April 8, 1912.



aggerated, Kernig's sign, contralateral reflex, neck sign, ankle clonus, and Babinski; all usually appearing some time during the course of every form of meningitis—in some persisting from the time of appearance, in others appearing and disappearing from time to time. These symptoms appearing in any case always lead to a suspicion at least, if not a strong presumption, that the case is one of meningitis.

In discussing the special points of differential diagnosis, I will first take up tuberculous meningitis. In tuberculous meningitis I feel that the family history very often gives us the first clue to what the trouble really is. In this form of meningitis there can usually be obtained a definite history of contact with a tuberculous person. I have rarely failed in obtaining such a history in cases of tuberculous meningitis which I have seen. It is not necessary by any means that the tuberculous person be a member of the family, and for this reason I think most histories fail to show the source of infection; the investigator rarely asks whether there is any possibility of contact outside of the immediate family. Of course, a nurse or a neighbor with whom the child be left, or a pet, or a boarder, may be the source of infection as well as any member of the family, and one of these very often I have found to be the one from whom the infection was contracted. Therefore I consider the history of contact the thing of first importance in our history of suspicious cases of tuberculous meningitis. Tuberculous meningitis is most frequent in young children, especially between the ages of two and seven, at times after puberty. The onset in the younger children is often acute, being ushered in with convulsions. The older the child, the more gradual is the onset likely to be. I have found the following points to be fairly common in such cases: An early change in disposition; the child who is ordinarily active and alert shows the first signs by becoming listless and inactive; and a rather plegmatic child becomes irritable and fussy. Irritability, however, is a common symptom in all children coming down with meningitis, as it is the first sign of meningeal irritation. Rapid changes in peripheral circulation are also very common in tuberculous meningitis; for instance, at one time the mother will notice the cheeks of the child are much flushed, perhaps a few minutes later, a half an hour or so later, she will find the child is very pale; at times the hands and feet may be very hot, then again in a short time they may be cold.

This rapid change in circulation is met with fairly commonly. Loss of appetite and fitful sleep are also among the early symptoms. In older children, headache is a common symptom, with an increasing desire to keep away from a bright light (photophobia), gradually increasing as the disease progresses. On early examination these cases often have a negative physical examination; seldom are signs found in their heart or lungs or abdomen; and it is only from a careful study of their history, slight rigidity of the neck, at times suspicious reflexes, such as Kernig's sign, or the neck sign, or eye symptoms; sluggish and unequal pupils or strabismus—that may give the first suggestion of meningeal trouble. As the disease progresses all these symptoms increase more or less rapidly.

The peculiarity of the reflexes in tuberculous meningitis is that they are not at all constant. I have seen a child with marked double Kernig which an hour later showed no Kernig at all, a few hours after showing definite Kernig on one side, the other being apparently normal. This condition of changing reflexes is of very common occurrence in tuberculous meningitis. There is a gradual increase in cerebral cloudiness, with more or less total unconsciousness, from which at first the patient can be roused, but from which later he cannot be roused. Convulsions are not of nearly so common occurrence in tuberculous meningitis as they are in the other forms, though the younger the child the more likely it is to have convulsions, even to having the condition ushered in in this way.

The sharp piercing cry which is so characteristic of these cases may or may not exist, and is apt to be present rather late than early, though in the latest stages the child usually lies absolutely unconscious and perfectly flaccid; or, again, unconscious and perfectly rigid, the eyes half-closed and blood-shot. Such a case can be diagnosed almost at sight. The early diagnosis of such a case may depend to some extent not only on the physical examination and the history, but on the findings in the spinal fluid. Lumbar puncture in such cases gives an increased amount of fluid, perfectly clear, and, under more or less pressure, the amount varies from 10 to 100 c.c. of clear fluid. The examination of this fluid gives certain characteristic findings. There is always an increased amount of albumin and globulin, as well as fibrin. The fibrin clot, which forms sometimes almost immediately, but always within the first twenty-four hours, often

has a very characteristic appearance—that of a cobweb, spreading from the top of the test tube to the bottom, with delicate threads attached to the sides of the tube.

The cellular count in tuberculous meningitis shows an increase of cells, from 90 to 100 per cent. being lymphocytes, the number ranging from just above the normal of 20 to as high as 500 per cubic centimeter, the average being about 100. The tubercle bacillus can be found in almost every case on careful examination, the percentage of positive findings depending entirely upon the individual making the examination. They often are present in large numbers, especially in the clot. Animal inoculations always give positive results at the end of six weeks when inoculated into guinea pigs.

The treatment of tuberculous meningitis is perhaps the most hopeless of any condition in medicine. There are only a very few recorded cases of recovery from tuberculous meningitis which are authentic, for, as I will show later, almost identical findings can be obtained in the spinal fluid in other conditions, with the exception that the tubercle bacilli are absent. Before this was fully appreciated, many cases were reported as being tuberculous meningitis which undoubtedly belonged to the other forms. Lumbar puncture offers the only hopeful method of palliative treatment. It is often followed by absolute rest and peace where the child has been crying out and restless; there may be at times a return to consciousness where unconsciousness has been present for many hours. Our main effort in such cases is to put the patient in as much ease as possible; bromides, chloral, and morphin offer the best means for accomplishing this end. They should, I believe, be pushed to their physiological limits.

Within the last few months there has been some interesting experimental work introduced by Manwaring at the Rockefeller Institute, who has been experimenting with tuberculous meningitis in dogs. He was able to markedly retard the infection in the dogs by cerebral injections of strong leukocytic extract. How applicable this method will be in human cases is yet to be discovered, at least any procedure which offers some hope would be justifiable in such cases.

Almost any pyogenic organism is capable of producing meningitis, but certain organisms have a predilection for attacking the meninges. The best known of these is the meningococcus. This form occurs in epidemics, and is spoken of as epidemic



meningitis or as cerebrospinal meningitis. This term, however, as you will see, is inaccurate, as all the forms of pyogenic meningitis are cerebrospinal.

Meningococcus meningitis occurs also in sporadic cases, frequently in the spring of the year. It is much more likely to attack older children (that is, from five years up) than younger—in this differing from the tuberculous form—though no age is exempt, as I have seen infants a few months old and also older people affected with meningococcus meningitis. The onset is usually sudden, though at times it may be very gradual. It is often ushered in with convulsions, vomiting, high temperature, delirium, and extreme prostration. The reflexes are usually exaggerated, stiffness and retraction of the neck practically always being present; eye symptoms, both inequality and slow response to light, being usually present; strabismus is less frequent here than in tuberculous meningitis, though very often present. Kernig's sign, the neck sign, the contralateral reflex, ankle clonus, and Babinski's sign are usually present to a more or less marked extent. The diagnosis of meningitis in such cases is not hard to make. Lumbar puncture, which is always indicated where there are any cerebral symptoms, gives anywhere from a cloudy to a very purulent fluid unless the fluid is so thick that it hardly runs out of the needle. The amount varies according to the thickness of the exudate; where it is very thin, as high as 50 to 100 c.c. can be easily withdrawn. Globulin, albumin and fibrin are always increased. The cellular count in such cases is often very high, averaging above 100 cells to the cubic millimeter. Polymorphonuclear cells are much in excess, ranging anywhere from 60 to 100 per cent. On staining the diplococcus intracellularis or the meningococcus is easily found. It is a rather small diplococcus, gram negative and intracellular—that is, being found inside the leukocytes.

Since 1905, when anti-serum was first introduced in Europe, we have had a specific treatment. Flexner in this country improved on the potency of this serum, by the use of which the mortality has been reduced from an average of 80 per cent. to 25 per cent. However, there are always some very resistant cases and cases which do not respond to the serum. The serum has to be introduced into the spinal canal after the removal of all the spinal fluid possible. As a general rule, the same amount is introduced as is withdrawn, on an average from 30 to 40 c.c.



being introduced on four successive days. This, however, may have to be repeated as many as sixteen or twenty times before any permanent results are obtained. *The rule in any anti-serum treatment must be to give the serum as long as the source of the infection is still present.* This is ascertained by the clearing up of the spinal fluid, by the disappearance of the organism in a stained smear, by the disappearance of the polymorphonuclear cells, which are gradually displaced by lymphocytes, or by the entire disappearance of the cellular elements. The recovery of these cases is one of the most brilliant outcomes of experimental medicine; some of these cases recover by crisis, sometimes their recovery is slow and takes the form of lysis, and only occasionally one takes on a very slow chronic condition. In the refractory cases, the serum apparently has no effect and fatal termination proceeds as if no specific treatment had been instituted.

The next most common form of meningitis and, outside of epidemics, the form which is almost as common as sporadic meningococcic meningitis, is the influenza type. This is not infrequent during an epidemic of influenza, but occurs sporadically. At the Children's Hospital we rarely have a year go by without one or two such cases coming into our wards. The onset in these cases is practically identical with that of the meningococcus form, sudden and with all the typical reflex signs and symptoms found in that form. Lumbar puncture in these cases often does not give so purulent a fluid, though it is usually cloudy, increased in amount, under pressure, with an increase in globulin, albumin, and fibrin, and a high polymorphonuclear cellular count, the influenza bacillus being found in stained specimens. This organism is usually not intracellular, but is gram negative. It can be easily distinguished by its fine, delicate outline. Within the last year Dr. Martha Wollstein, working at the Rockefeller Institute, has produced an anti-influenza meningitis serum, which experimentally has been proved to be of considerable potency. It has been tried in a small series of human cases with very good results. The opportunity, however, for trying out this serum is not so extensive as has been the anti-meningococcic serum, and therefore its ultimate value is still to be decided by clinical trials of this serum. It should be tried in any case where the influenza bacillus has been proved to be the cause of the meningitis.

Pneumococcus meningitis, oftenest following the course of pneumonia, but even sporadically, is met with. This form is one of the most rapidly fatal forms of meningitis that we have to deal with, the total duration often being counted in hours rather than days, especially when it appears in the course of a pneumonia. The signs and symptoms are the same—except perhaps more exaggerated—as are the symptoms in the fulminating cases of meningococcus meningitis. The spinal fluid is apt to be thick, often being obtained with difficulty through the ordinary spinal puncture needle. The distinguishing feature in this fluid is the presence of the pneumococcus, which is distinguished by the presence of its capsule and morphologic form. It is a gram positive organism. So far, I have not seen any report of recoveries in these cases, and I have personally never seen one recover. Within the last year or two there have been many attempts to produce a potent anti-serum; so far, without much success. However, pneumococcus anti-serum should be used in any case of pneumococcus meningitis, as offering the best remedy for recovery.

Practically the same may be said of streptococcus meningitis. It usually has a very sudden onset, with more exaggerated signs and symptoms than the average case of meningococcic meningitis. The spinal fluid is usually not so thick as in the pneumococcic form, but is usually very purulent. Its distinguishing feature is here again found in the smears by the presence of streptococci in chains. This is a gram positive organism.

Here again there is no specific treatment that has been of any avail, all of the cases, so far as I am aware, proving fatal. However, antistreptococcic serum should be used. Streptococcus meningitis very frequently follows mastoid or oral infections, and is apt to be focal in starting, becoming general later. There have been recorded cases of focal streptococcus meningitis which have recovered by extensive operations being performed early before the meninges generally are involved. Any of the other pyogenic organisms are capable of producing meningitis. The typhoid bacillus, for instance, during the course of typhoid, occasionally attacks the meninges, proving fatal. The staphylococcus, the colon bacillus, and the bacillus pyocyaneus have been found as causative factors in sporadic cases of meningitis.

It will be seen from this enumeration that the only positive

way of differentiating these different types of meningitis caused by pyogenic organisms is the detection of the organism in the stained specimen or by cultural growth; and here the aid of the laboratory in making these diagnoses is essential; and the more so is this true since the specific sera have been introduced, as now one has some hope of successfully treating a case when the organism is known by introducing the specific anti-serum for the infecting organism. It is along this line of anti-sera treatment that our greatest advances will be made in the next few years in treating these conditions, as they have already been made with the meningococcus and influenza types; and these advances are entirely due to animal laboratory experimentation, for without this we would have been unable to produce any specific anti-sera.

I wish also to call attention to a few other meningeal conditions which at times simulate the more severe types of meningitis. First, there is the type of poliomyeloencephalitis, or the encephalitic type of infantile paralysis. In our late epidemics of this condition there were from 10 per cent. to 20 per cent. of the cases which showed meningeal irritation or cerebral involvement, in which the symptoms are the same as in other forms of true meningitis. The onset is sudden with either cerebral or meningeal symptoms. In the meningitic form, convulsions, rigidity of the neck, exaggerated reflexes, Kernig's sign, the neck sign, ankle clonus, all being present. In the cerebral and bulbar type, the respiratory center is affected, often with a rapidly fatal outcome. In these cases there are marked mental symptoms, unconsciousness, delirium, stupor, with labored respiration. General muscular sensitiveness is often present—a sign which is not so frequently found in the other types of meningitis. In poliomyeloencephalitis, as these forms are collectively termed, the encephalitic and meningeal symptoms pass off rapidly unless the case ends fatally; and the paralysis either appears at this time, if there is any involvement of the anterior horns of the spinal cord, or the case clears up without any resultant paralysis. In such cases, lumbar puncture gives an increased amount of fluid with slight increase of globulin; at times there is no fibrin clot, though the fibrin clot may be present; I have found it in about half the cases. The cellular elements are usually moderately increased—from 20 to 50 cells per cubic millimeter, though sometimes a much higher count is found,



the mononuclear type usually predominating; early, there is a slight polynuclear excess. The spinal fluid, however, rapidly clears up, which differentiates it absolutely from the true types of meningitis. It will be seen that this fluid shows very little difference from the fluid found in the early forms of tuberculous meningitis, except, of course, that in these cases the tubercle bacillus is never found, so that the laboratory finding of the tubercle bacillus in the early cases becomes a very important point in the diagnosis; and in some of these cases I know of no other means of early differentiation.

This is also true of another type of meningeal infection; the group variously known as encephalitis, meningismus, toxic meningitis, and traumatic meningismus. In children, this form of meningeal involvement is not uncommon. It is often ushered in suddenly, with either convulsion or marked prostration, collapse accompanied by cerebral and meningeal signs and symptoms, the cerebral symptoms usually predominating, unconsciousness and restlessness being often very much more marked than the changes in the reflexes, though stiffness of the neck even amounting to rigidity and suspicious Kernig's sign and the neck sign are at times present. The diagnosis of this condition is difficult, as it is almost impossible to differentiate an early case of encephalitis from an early case of tuberculous meningitis, and it is here that the importance of careful personal history with special reference to any contact with tuberculosis is important. The spinal fluid in such cases usually shows a slight to moderate increase in quantity; is perfectly clear, shows a slight increase in globulin; fibrin clot may or may not be present, and when present is usually small in amount. There is usually an increase in the cellular elements, principally in the mononuclear lymphocytic type, from 30 to 50 to the cubic millimeter, at times going very much higher. So far it resembles very closely the findings of early tuberculous meningitis, but here again the absence of the tubercle bacillus is the true indicator of the condition, and knowing its presence materially changes the prognosis of the case. The majority of these cases rapidly recover, though a certain percentage of them leave some residual marks in the central nervous system, as Southard and I lately showed in a study of a series of these cases from the Children's Hospital.

The only form of treatment besides symptomatic medication in these cases is lumbar puncture, which I believe is of definite



therapeutic value in all forms of meningitis, as well as in meningismus and in the poliomyeloencephalitic type of infantile paralysis, because by repeated lumbar punctures toxins and irritating substances are removed. The etiology of these cases of encephalitis may be any infection; often they appear during the course of an acute infection, such as pneumonia, acute intestinal conditions, during typhoid, and also as a primary condition; it also appears after trauma. The course is usually, as far as the acute symptoms go, rather short, though the convalescence is often protracted, and the mental symptoms may be a long time in disappearing; and, as has been stated, there may be more or less permanent injury to the mentality.

It will be seen from this rather brief résumé of the various types of meningeal infections that we are still far from having reached the end in our studies of these conditions. It is to be hoped that the forms so far unsuccessfully treated will in the future come within the scope of successful treatment.

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PYELITIS IN INFANCY AND CHILDHOOD.—An extremely good account of this affection is given by Still, in a paper printed in the *North of England Clinical Journal* for January, 1912. He remarks that unrecognized acute pyelitis in infancy gives rise to prolonged fever of most severe degree, with profound constitutional disturbance, which may end in death. Recognized and treated with appropriate drugs, it often subsides in a few days, and, even if symptoms persist for a time, they quickly become less severe, yielding to treatment before long. After reference to the acute cases, with peculiar and almost sudden onset by rigor or convulsion, the extremely misleading cases in which the disease has become chronic are discussed, as when a child is brought to the doctor solely for wasting and fretfulness. Finally, the virtually specific treatment with potassium citrate is described, and emphasis is laid on the paramount necessity of maintaining the constant alkalinity of the urine for at least a week or ten days. A child of three may require 20 grains or more of the potassium salt every two hours; an infant, 10 grains every two hours.—*Universal Medical Record*.

# BLINDNESS AS A RESULT OF INFLAMMATORY DISEASE, AFFECTING CONJUNCTIVA AND CORNEA.\*

BY COLMAN WARD CUTLER, M.D.

Total blindness is rare in diseases of the conjunctiva and cornea, and, happily, the ignorance and neglect to which it has been so often due are giving way to the dawn of a day of concerted action in which large numbers of kindly people are striving to help the women and children and to instruct the unfortunate and selfish or the vicious and to arouse in them a sense of their responsibility.

Partial blindness is far more frequent and has not yet received adequate treatment.

Defects due to scars from keratitis of various kinds exert a decisive influence on the lives of many.

Phlyctenules with the suggestion of a probable tuberculosis are very common and the proper hygiene needed to prevent their recurrence in children of the poorer classes is beginning to be realized.

Reference may be made to the admirable reports of the social service work at the Massachusetts Charitable Eye and Ear Infirmary and especially to the investigations conducted by Henry C. Greene; also to the work of the Committee on Blindness of the New York Association for the Blind, to the courtesy of whose secretary the writer is indebted for an introduction to this phase of a subject in which he has long been interested.

Sydney Stephenson closes his very able and complete monograph with the famous aphorism of Hermann Cohn, "*Die Blenorrea neonatorum kann und muss aus allen civilisirten Staaten verschwinden.*"

The progress that has been made during the last decade in the prevention of blindness from ophthalmia neonatorum has been due chiefly to the energy of laymen. The literature which has grown very rapidly in the last few years shows the zeal and the resources of societies and committees and individuals trained for the admirable work of social service, but with a few honorable exceptions the medical profession has had small part in this campaign of preventive medicine. We have busied ourselves with the care of the individual cases and our attention has been

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\* Read before the New York State Medical Society at its Annual Meeting in Albany, April 18, 1912.

directed to the questions of treatment rather than to the larger problems which interest the community and which are beginning to open a way to the root of the evil.

It is time to take a broad view of the situation and to join in the team work, without which no real progress is possible.

Trustworthy statistics are difficult to obtain. We know, however, that many cases of gonorrheal ophthalmia in children still occur and that the blind whose sight might have been saved are still with us.

Two measures, if they are enforced, will suffice to make ophthalmia of the newborn as rare as leprosy and its existence will become as abhorrent and with far better reason. These measures are:—

First: The mandatory reporting of all cases of red and secreting eyes in infants to the local board of health, and the energetic investigation and following up of those that are not stated as having been put at once in competent hands; and,

Second: The mandatory use of a satisfactory prophylactic at birth or a clear statement by the physician in charge of the reason why this was omitted.

Such laws exist, but they are not universal or they are not enforced. In Massachusetts there is a good law, applying to midwives and to physicians alike, which has been emphasized by the prosecution and punishment of several physicians. This law, requiring the reporting of all cases of ophthalmia neonatorum, was passed in 1905, but only in 1910 was it enforced. Then the Boston Board of Health obtained the conviction of a physician. "The month before the conviction the number of returns under the law had been 10; the month after the number was 20. The next month, there being no more prosecutions, the number fell back to 10; but in December new prosecutions were successfully carried through and the returns rose during the next four months to 15, 32, 97 and 116 respectively. The last figure seems to represent a fairly thorough enforcement of the law and is being maintained." (Henderson, *Boston Common*, October 7, 1911.)

The same author states, "The enforcement of the reporting law, however, is the least important part of the Boston Board of Health's preventive work. Every reported case of ophthalmia neonatorum is immediately followed up by a competent nurse who sees to it that proper treatment is given the child and that if necessary it is sent to the hospital.

"Since the institution of the 'follow up' system in Boston not a single known case of the disease has resulted in blindness."

In New York the "Howe law," based upon a recommendation of the American Ophthalmological Society and enacted in 1890, marked the beginning of preventive work in this country. It applies only to midwives, but half the births are attended by physicians, and if the amended Boston law of 1905 were followed, many more cases of ophthalmia would be reported and undoubtedly some of the blind infants would be spared.

According to the Sanitary Code of New York City, physicians and hospitals are required to report cases of trachoma and suppurative conjunctivitis (San. Code, Sec. 133, 140), but it has not been enforced. It is stated officially, however, that this is to be enforced.

The report must be prompt to be effective. A recent State law requires that a notification of all births shall be returned within thirty-six hours by every physician and midwife, in which it is stated what prophylactic was used, and on the certificate of birth the question is asked, "What preventive for ophthalmia neonatorum did you use? If none, state the reason therefor." New York, Buffalo, Albany and Yonkers are exempt from this law.

A digest of the legislation of this country may be found in Public Health Bulletin No. 49, by J. W. Kerr, Assistant Surgeon General, "Ophthalmia Neonatorum: An Analysis of the Laws and Regulations Relating Thereto in Force in the United States." Many of these laws are good in part, few are perfect. In Indiana and North Dakota provision is made in a law whereby all birth certificates shall have thereon the question, "Were precautions taken against ophthalmia neonatorum?" and failure to answer the same renders unlawful all bills or charges for professional services in connection with the case.

In the larger cities the enforcement of these laws is practically impossible without the coöperation of all physicians, which has been gained very effectually in Massachusetts as has been stated.

All cases of ophthalmia should be reported at once; the "follow up" system should be carried out by the board of health, and a suitable prophylactic—preferably nitrate of silver 1 per cent.—should be used in all cases by midwives and in most cases by physicians.



To report all cases of red and secreting eyes, and to apply nitrate of silver to all eyes at birth, must, then, be a matter of routine, so that the occasional cases of gonorrheal infection shall not escape. For this reason the name ophthalmia neonatorum has practical value, although it does not permit scientific deductions as to the prevalence of the gonorrheal type of the disease.

It would be interesting and valuable to examine every case bacteriologically, but it is more important to treat promptly and effectively every suspicious eye. Results are needed even more than statistics.

Dr. Cragin reports 66 cases of ophthalmia neonatorum in one year in the Sloane Maternity Hospital, but only 1 case showed the presence of gonococci. No wonder the treatment with 20 per cent. argyrol (as is the rule in that hospital) is effective in such a class of cases. On the other hand, at the New York Foundling Hospital no cases of ophthalmia neonatorum in the maternity service are recorded in the past year, because only the cases in which gonococci are found are considered important. Nitrate of silver, 1 per cent. solution, is used at birth. In the hospital, however, 52 cases of gonorrheal conjunctivitis were treated in 1910 and 41 cases in 1911. No eyes were lost and I am convinced that if a child is seen before the cornea is involved, prompt and vigorous treatment with nitrate of silver 1 per cent., or, in the more threatening cases, 2 per cent., will always save the eye. These cases, with few exceptions, were brought in as foundlings and it was usually impossible to trace their origin or to determine their exact age.

At present two children in the hospital—one a month old and the other two years old, both with gonorrheal vaginitis—have developed a severe gonorrheal conjunctivitis. In both cases the vaginitis was so slight as to escape the attention of the nurses, but there could have been no other source of the conjunctivitis.

It is obvious that it is impossible to generalize in the face of such diverse data. We cannot afford, however, to rest complacently at the beginning of the great campaign, nor to close our eyes to the prevalence of gonorrheal conjunctivitis as a late infection in children, as well as in the newborn.

Late ophthalmia, that is, conjunctivitis appearing after the first week, is probably more frequent than has been believed. Dr. Whitridge Williams writes that he has examined the record

of 2,000 cases at Johns Hopkins Hospital, 1,000 being cared for in the hospital and 1,000 by the out-patient department. All cases had received 1 or 2 per cent. nitrate of silver in the eyes immediately after birth. To quote Dr. Williams' words, "I find that of the 1,000 cases in the out-patient service 2 developed gonorrheal ophthalmia, and of the 1,000 hospital cases 10 developed true gonorrheal ophthalmia." This gives a total of 12 cases out of 2,000. It is of interest to note that in 7 of this number the symptoms first appeared on the eighth day or later. Dr. Williams stated that he believed that if the total number of out-patients had been followed up more than eight days the proportion would have been larger. This would show that many cases which have remained in maternity hospitals only a week, or which have not been seen by the physicians later, may still develop ophthalmia from careless nursing after birth. It has been stated by many earlier observers that the late cases are only seen by the ophthalmologist, and not always by him, because of ignorant parents who are loath to bring their children to the dispensary or to seek treatment, and because the cases have already passed beyond the attention of the obstetrician. It is recognized, also, that these secondary cases are apt to be more severe and more threatening than the cases of true ophthalmia neonatorum.

It is probable that many of the children brought to the hospitals with gonorrheal ophthalmia—not all—were brought into the world by midwives, and so long as women without training, often illiterate, are permitted to assume such grave responsibilities, so long will the deplorable evils continue and for this the intelligent classes, and especially the medical profession, should be held responsible.

In 1910 the New York City Department of Health issued permits to 1,344 midwives, who reported 40 per cent. of the births, and it is stated that 50 per cent. of all births throughout the country are under the management of midwives, and no obstetricians or lying-in hospitals could fill their places among the foreign-born classes of our population.

In 1912 a staff of five physicians and eight nurses has been appointed to supervise the work of the midwives, but the evil is deeper. No examination or educational standard is imposed upon these women who are allowed to assume the duties of a physician and of a trained nurse. There is no compulsion or inducement offered for midwives to enter schools for training, be-

cause their self-respect as a profession has not been sufficiently developed.

A question arises which it is difficult to answer. The number of midwives registered in New York is 1344. Does this include all the women who practice midwifery, and is it possible for them to avoid reporting cases without detection? It is to be feared that some physicians are willing to sign their birth certificates for a consideration.

A small school for midwives has been established in connection with Bellevue Hospital. It is admirable, but it is only a beginning. Training should be provided and made compulsory on an adequate scale, under State control, if the profession of midwifery is to be tolerated. This has been done in other countries and our attitude is disgraceful.

These brief allusions to large subjects show how necessary it is for all members of the community to work together if the desired ends are to be attained. Legislators, physicians, nurses, social workers, all have their part in the "team work" and the community is taking an ever-increasing interest.

From what has been said, we are justified in drawing the following conclusions regarding the importance:—

First, of enforcing the use of nitrate of silver by midwives and, if possible, by physicians, at birth.

Second, recognizing and treating all cases of severe conjunctivitis in young children, and the enforcement of laws relating to reporting and following up.

Third, of classifying, when it can be done without delaying treatment, into

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| I. Conjunctivitis of the newborn.        | } a. Gonorrheal.<br>b. Non-gonorrheal. |
| II. Conjunctivitis after the first week. |  |
| III. Conjunctivitis of adults.           |  |

This should be done as a matter of record in institutions and by boards of health, but the treatment should never wait for the smear.

Fourth, reporting all cases of venereal diseases to the boards of health, so that reliable data may be obtained, as has been done in tuberculosis. This is already required in certain States.

Fifth, the agitation of the midwife question until their training and examination are assured.

8 East 54th Street, New York.

## HEMOPHILIA NEONATORUM IN A FAMILY OF FOUR INFANTS.

BY ROBERT L. PITFIELD, M.D.,  
Germantown, Philadelphia.

Baby I., the fourth child of healthy parents, was born normally after a short labor. There was nothing about the child at the time of birth to indicate that it might be a bleeder, or have icterus. His three brothers at birth or shortly afterwards became icteric; bled excessively, to such a degree that one succumbed, and one was so afflicted that even to-day, at the age of five, he cannot walk or talk to any extent.

The first child, a boy, was born naturally, but soon after birth became very yellow, vomited black material and passed stools of a dark, tarry nature, which were no doubt mostly blood. With this condition there was fever and rapid loss of weight. At the end of eighteen days the icterus was so intense that the life of the child was despaired of. At this time the skin was a dark coffee brown. Finally he recovered, and is to-day a sturdy, healthy child.

The second child became icteric on the third day. Subdural hemorrhages quickly followed, which were manifested by coma and convulsions, but recovered. At five years the child could hardly walk and was mentally defective. His powers of co-ordination were very poor. His physician, Dr. Herbert U. Jones, at a cranioplastic operation, released some dural adhesions to the cerebellum, with marked improvement in his nervous health. No doubt these adhesions occupied the site of old subdural hemorrhages.

The third child, also a male, was icteric when born, and became profoundly so when forty-eight hours old, and died from subdural hemorrhages before living seventy-two hours. At autopsy, subdural hemorrhages were found, also hemorrhages in the liver. The history of hemophilic jaundice in a family of three infants of a type that was of an ascending degree of malignancy presaged ill for the life, and even future health, of the child yet to be born.

The mother, while small and rather thin, was healthy, save for a marked tendency to become infected very easily. After her first labor she suffered from sepsis. Indeed, every puerperium had been marked by an occurrence of fever. After the birth of the last child a slight caking of the breast and a trifling tonsillar



infection were both accompanied by high fever, chills and sweats. In the mother's pelvis, in the neighborhood of the left tube, there was an old inflammatory mass. The father was a superb specimen of a man in the late thirties. He was large, muscular, and had never exhibited any tendency to bleed; but whenever ill always became jaundiced. Indeed, in no branch of the family was there any hemophilic history. With the knowledge that the newborn child would shortly begin to exhibit hemophilic tendencies and to become jaundiced, preparations were at once made, at the suggestion of Dr. Herbert Jones, who had attended the mother previously, to obviate this by the method of Dr. Edgar Welch, of New York. Dr. Welch has treated very successfully a number of hemophilic cases in the newborn by the subcutaneous use of human blood serum. The child weighed at birth  $8\frac{1}{2}$  pounds. It cried lustily, and did not exhibit the slightest tendency to bleed from the end or mucous membranes. In five hours, however, a faint icterus appeared; at the end of twenty-four hours this became marked and minute petechial hemorrhages were seen in the skin. The child did not exhibit any nervous manifestations, such as restlessness, undue crying or sleeplessness. At the end of twenty-four hours he was treated with serum obtained by aspirating blood from the veins of the nurse. During the second and third days of the child's life 72 c.c. of blood were injected in doses from 4 c.c. to 15 c.c. At the end of three days it could be seen that the child was better. The petechiæ disappeared, the jaundice cleared up, and, in fact, the child appeared and acted as a normal one would. There was not anything to record about the infant, save that he nursed regularly, and at the end of a month had gained 24 ounces and was normal in every way. It seems quite apparent that this child, like his brothers, had early begun to exhibit hemophilic tendencies and to become jaundiced, and that these processes had been stayed or effectively guarded against by the prophylactic action of human serum.

The blood of the child no doubt lacked for some reason the property to coagulate promptly, and this deficiency was supplied by the serum from the nurse.

In using foreign serum, care should be taken to see if it, perchance, might be hemolytic to the recipient's red corpuscles before injection. This, of course, is an important precaution which should have been done in this case, but it appears to have been unnecessary in this instance. While there was not the slightest

reason to suspect syphilis in either of the parents, a Wassermann reaction to rule out this disease-element in the etiology should have been made, because of the ease with which people may be innocently infected, and quite ignorantly so. Schwartz and Ottenberg, after a critical survey of hemophilia, conclude that it is probably some infection; they also conclude that syphilis alone can be the agent, and that in all probability the phenomena of hemophilia are due to the destruction or interference with the production of thrombokinase. That syphilis was not a factor in this family is evidenced by the fact that spirochetæ pallida were not found at autopsy in the organs of the child that succumbed. As a prophylactic measure, large doses of calcium chlorid were given to the mother during her pregnancy, and acid fruits were excluded from her diet, and this might have had some slight influence. Ether was used as an anesthetic in the last labor instead of chloroform, and while the latter has a necrotic action on the liver cells, and can, and does, cause jaundice, it is not believed that the substitute of ether had any very marked influence on the favorable outcome of the case, but is a detail to be considered.

#### REFERENCES.

- Welch, J. E. *American Journal of Medical Science*, June, 1910.  
Schwartz and Ottenberg. *Ibid*, July, 1910.

DIPHTHERIA OF THE ESOPHAGUS.—J. D. Rolleston reports (*British Journal of Children's Diseases*, January, 1912, Vol. IX., No. 97) the case of a boy, aged two years and four months, who was admitted to hospital on the eleventh day of disease and died in seven hours. At the *postmortem*, among other findings, the middle third of the esophagus presented some infection of the mucosa, and in the lower third "were two longitudinal areas of necrosis, 3.5 cm. each in length, coalescing below, where each measured 2.2 cm. in width, and stopping just short of the lower end of the esophagus. No diphtheritic membrane was left, but direct smears and cultures showed numerous diphtheria bacilli." It is rare to find the esophagus involved. Rolleston finds 22 cases have been recorded since the discovery of the bacillus. Postdiphtheritic stricture of the esophagus has been recorded, and it is conceivable, Rolleston thinks, that if his case had recovered there would have been a stricture of the esophagus. The specimen has been added to the two that were already in the Museum of the Royal College of Surgeons.—*Universal Medical Record*.

## CONGENITAL HYDRONEPHROSIS, WITH APLASIA OF THE URETER.

BY FRANK VAN DER BOGERT, M.D.,  
Schenectady, N. Y.

Congenital strictures and defects of the ureter, accompanied at times by hydronephrosis, cannot be considered exceedingly rare. Bottomley, up to November, 1910, was able to collect 56 cases, in 8 of which the location of the stricture corresponded to that of my own case. Stanton, from the autopsy records of the Bender Laboratory, gives 4 cases of congenital hydronephrosis. The condition seems to more often affect the left ureter, the left being affected in 27 of Bottomley's cases as against the right in 17. In the case to be reported the lesion occurred on the left side.

The patient, a boy, was four and one-half months old when first seen. The family history was interesting and suggested a diagnosis of congenital syphilis. The mother is said to have weak lungs, though "not diseased." The first pregnancy was followed by a miscarriage, the second by a premature birth, then came two more miscarriages, a child now living and well, another miscarriage, and another living child, which died when three and one-half years old, the cause of death being given as tuberculous meningitis. The ninth pregnancy resulted in a child which died at three months of "tuberculosis of the bowels." The above is a fairly accurate record, though the mother is said to have four living children, all of whom are not accounted for. The patient was born at full term and said to weight 9 pounds at birth. He was the result of the twelfth pregnancy within a period of twenty-one years and was nursed only ten days, although a child born just previously, evidently one of those unaccounted for, was at the breast for a year.

After the short nursing period the baby was put upon a proprietary food prepared without milk, and was said to be taking it well, but coughing and vomiting a great deal, its weight not increasing. The cough had been present since birth. There was much emaciation, and in the left side of a large flabby abdomen could be seen three prominences which gave the appearance of distended coils of intestine. These the mother had noticed just prior to her attendance.

The patient was first seen on July 9th last, when a von Pirquet was made, the feeding regulated and mercurial inunctions prescribed. When next seen, one week later, there had been no reaction from the tuberculin. The weight, the first of which I



have record, was 8 pounds and 15 ounces, partly clothed. Though the feeding was most carefully managed, there was no permanent gain—8 pounds, 8 ounces, stripped, on September 1st. On August 30th he was admitted to the Children's Department of the Ellis Hospital, where he died suddenly on September 3d. The interesting points in the symptomatology, not already mentioned, were: vomiting, which persisted, more or less, up to the time of death, but which apparently yielded to the careful feeding; very frequent urination, which is a symptom common to



these cases, and still more interesting; distress when placed or held upon the left side. This symptom was especially noted, since only certain members of the household could hold him with comfort.

At autopsy the bladder was found to be markedly distended, reaching to the navel, probably a terminal condition. The transverse colon was prolapsed, the small bowel filling the abdomen above it and apparently forced there by pressure from below. The right kidney and ureter were apparently normal, the kidney somewhat hypertrophied (compensatory).

On the left side was a large hydronephrosis firmly adherent to surrounding tissues, the ureter, on this side, ending almost abruptly two inches below the renal pelvis. The accompanying photograph shows the condition.

111 Union Street.



## SOCIETY REPORTS.

### THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.\*

*Stated Meeting, Held April 11, 1912.*

WILLIAM SHANNON, M.D., CHAIRMAN.

#### A BRIEF STATEMENT CONCERNING THE AGENTS CAUSING MEASLES AND SCARLET FEVER.

DR. WILLIAM H. PARK read this paper, which was published in ARCHIVES for June, 1912. (See p. 413.)

#### INCLUSION BODIES IN THE BLOOD OF SCARLET FEVER AS A MEANS OF DIFFERENTIAL DIAGNOSIS.

DR. MATTHIAS NICOLL, JR., and DR. ANNA M. WILLIAMS presented this communication, which Dr. Nicoll read. He said that Professor Dohle, of the Institute of Pathology of Kieff, had reported that in 30 cases of scarlet fever blood examined by him he had found almost without exception certain inclusion bodies in the polynuclear leukocytes. These bodies had not previously been described. By various methods of staining they could be differentiated from the nuclear substance, even when they lay near it. They could not be found after the sixth day of the disease. A large number of control cases were examined and inclusion bodies were found in but three. (See ARCHIVES for May, 1912, p. 350.)

#### SOME FEATURES OF SCARLET FEVER AND ITS COMPLICATIONS.

DR. HENRY W. BERG read this paper.

Dr. Berg said that the eruptions of scarlatina as such had many points of interest, being a red, punctate, erythematous rash, sometimes very difficult to differentiate from that of toxic scarlatinal erythemas. These, however, lack uniformity, where that of scarlatina is *scarlatinal* throughout.

In the desquamative stage of the eruption the diagnosis was readily made. The desquamation never need be confounded with that of measles, although it may be confounded with that

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\* Report furnished by Secretary of Section, Dr. Hong.

of dermatitis, exfoliativa or the pseudo-desquamations of some types of eczemas.

The various anginas of scarlatina are toxic, septic and diphtheritic, and each has a corresponding cervical lymphadenitis. When in a lymphadenitis there is painful enlargement of the glands under the sternocleidomastoid muscle the patient holds the head rigid, simulating cervical rigidity and opisthotonos, which must be differentiated from the similar symptoms present in a complicating meningitis.

Dr. Berg said, also, that the temperature curve told of the severity of the infection and approximately the day of the disease. The value of an accurate temperature chart was particularly to enable the physician to detect the onset of a complication, which would be evidenced by a rise in temperature, breaking the even curve of the fastigium, accompanied by abrupt deviation of the pulse and respiration rate.

Scarlatinal nephritis was much commoner in private practice than in hospital practice, probably because the patients are kept in bed until desquamation is complete and are kept on a fluid diet, mostly milk, until they have passed the stage of acute symptoms. Most of the cases of scarlatinal nephritis occur during the stage of desquamation. The onset of nephritis may be very abrupt and severe, albuminuria, hematuria, anuria may come on rapidly, with fever and edema, and the patient change quickly from a convalescent to an acutely sick individual. When improvement begins it is apt to go on to recovery.

THE TREATMENT OF SCARLET FEVER—PROPHYLACTIC, DIETETIC,  
MEDICINAL, AND SERUM THERAPY.

DR. LOUIS FISCHER read this paper, which was printed in *ARCHIVES* for July, 1912. (See p. 493.)

DR. JOHN A. KOLMER, of Philadelphia, said that he could not add to what had been said regarding inclusion bodies except to state that all recognized the importance of such findings if they would hold good in differentiating true scarlet fever from the scarlatiniform serum rashes. These were the rashes that had given them a great deal of trouble in Philadelphia during the last year. There should be some way by which they could make a diagnosis from a clinical standpoint. His personal views in regard to the relation of the streptococcus to scarlet fever cor-

responded with those expressed by Dr. Park, that the streptococci were secondary invaders. There was one fact that should be recognized, and that was that the scarlatinal virus produced in the blood some condition which very much favored the growth of the streptococci in the blood and the organs of scarlet fever patients. The question of streptococci immunization in the prevention of scarlet fever was worthy of special mention. If it was true that such an immunization would prevent scarlet fever, then it might be contended that streptococci were the cause of the disease. Reading the Russian literature one was impressed with the apparent value of the method, but from an experimental standpoint it was not of value. The vaccine was given three times, at intervals of one week. Experimentally, a vaccine prepared and administered as they advised did not materially raise the streptococcic opsonic index of the blood. The speaker had immunized about 350 persons in Philadelphia one year ago by the Russian method; 14 of these developed rashes suggestive of scarlet fever. He thought the Russian reports should be viewed with healthy skepticism. In treating scarlet fever they had tried the use of the antistreptococcus serum. A horse was immunized with streptococci taken from scarlet fever patients. They did not know how the serum acted, but it was probably not bacteriolytic. It was most important to standardize the serum. Some cases were certainly benefited by the antistreptococcic serum, while there were others that were not; neither was it possible to say which cases would and which would not be helped by the serum. If one had the serum on hand it should be given, especially to the septic cases of scarlet fever. The presence of the streptococci could not be determined in the blood by blood culture. Dripping saline into the rectum was a very valuable treatment for the severe septic cases of scarlet fever. This was also true in the treatment of diphtheria, but, of course, it should be combined with the use of antitoxin. Dr. Kolmer said he had been interested in the rhinitis which developed in scarlet fever patients; when one sent a patient home with a running nose there was danger of a return case. They had treated 200 cases of septic rhinitis by means of bacterins; this was not designed to combat the scarlet fever virus, but was aimed against the super-added infection. There were many cases showing the presence in the nasal secretions of staphylococci, and in these cases stock bacterins would give very satisfactory results.

DR. HENRY DWIGHT CHAPIN said it was not always easy to differentiate between a tonsillitis of scarlet fever and an ordinary tonsillitis. However, in real scarlet fever there were certain points that aided in making this differentiation. First, the condition of the tongue, which in the first day of the disease would be found covered with a white fur and with the papillæ seen coming through; on the second and third day it would clear up on the tip and edges and then there would be found the typical beef tongue. Secondly, there was the punctate form of eruption, which was marked over the soft palate, and this they did not get even in the most severe cases of tonsillitis. Myocarditis was more common than was supposed, probably because it was not more often recognized. Even in a mild form of the disease the pulse would run up after two or three weeks, and instead of being 70 or 80 it would be 90, 100, or 120, and it would remain there. When this occurred the heart should be carefully watched and one should think of myocardial involvement. One should examine the heart very carefully and keep a record of the pulse.

DR. ARTHUR RICHARD BRAUNLICH did not believe there was anything very characteristic about the desquamation of scarlet fever; he had seen patients with measles desquamate, as did those with scarlet fever. The majority of the cases of scarlet fever did not have a typical temperature curve; the slightest enlargement of a gland was sufficient to change the temperature curve. Very often the tongue was the most typical thing met with in scarlet fever; the typical strawberry tongue which appeared on the fourth or fifth day was present in a large percentage of the cases. In about 23 per cent. of the cases the diagnosis depended upon the punctate eruption, the temperature, and the pulse rate. As to treatment, plenty of water should be given to get the diuretic effect; if enough was given to a child twelve or fifteen years of age he could be made to pass 150 ounces of urine a day. He believed that giving plenty of water in the beginning of the disease would prevent many of the complications.

DR. LEWIS A. SEXTON said that he believed one of the most convincing points in the differential diagnosis of scarlet fever was the vasomotor paralysis caused by pressure. This paralysis lasted for two or three seconds and the skin again assumed its original scarlet color, to again blanch after a lapse of from five to eight seconds, after which it remained blanched for several



seconds, and in some cases, where the erythema was intense, it could be noted for several minutes. This condition was present in a large percentage of scarlet fever cases but was never found in the serum-therapy rashes of scarlatiniform erythemas other than scarlet fever.

A very common, and a most painful, complication in scarlet fever which had escaped mention was arthritis. In the Willard Parker Hospital this complication occurred in 7 per cent. of the cases. In 1911 there were 1,984 cases treated, and of these 147 cases had arthritis with the following involvement: Wrists, 110; elbows, 26; shoulders, 31; knees, 57; shoulders suppurative, 2; elbows suppurative, 1. In the suppurative shoulders, a pure culture of gonococcus was obtained from each (these being specific vaginitis cases).

In the other cases the organism found was streptococcus. Relative to the temperature curve in scarlet fever he had noted with much interest in the early stages of the disease that the pulse rate was out of proportion to the temperature, that a rapid pulse was one among the first manifestations of the disease. The rapid pulse often persisted for several days after the temperature had reached normal. While the results at Willard Parker Hospital had been very satisfactory, in his opinion if each patient could have more individual attention and the nose and throat kept clean and swabbed out with a 25 per cent. argyrol solution two or three times daily, this would reduce to a marked degree the complications.

There were admitted during the year 1911, 104 cases of scarlet fever complicated with diphtheria. Positive cultures developed during the year in 161, and that additional antitoxin was administered to 294 cases.

As to nasal irrigations and the fear that this form of treatment might infect the middle ear, he thought this danger had been over-estimated. In the diphtheria service, where 1,558 cases were treated in 1911, and 327 cases had had nasal irrigations, not a single mastoid had developed. This might be due, however, to the fact that the facilities for this form of treatment were the very best, and that the treatments were carried out by experts. He did not see why the middle ear should be any more endangered by these nasal irrigations in scarlet fever.

With regard to mastoids, he believed that with free incision of the tympanum as soon as any bulging appeared and the ap-

plication of the ice coil for twenty-four hours, a great many of these mastoids that would have otherwise gone on to operation could be aborted.

After the irrigations of the ear they employed equal parts of a  $\frac{1}{5,000}$  solution of bichlorid and 50 per cent. alcohol, putting 10 drops of this solution, warmed, into each ear with apparent benefit.

As to the vaccines in the treatment of gonococcus infections, the only results they had seen were ephemeral. One might diminish the discharge for a week or ten days, or by large doses of gonococcus vaccine stop the discharge, but this was not permanent; at the end of ten days or two weeks the discharge would return.

With regard to the treatment of nephritis, they had comparatively few cases. In 1910 they treated 2,302 cases of scarlet fever and had only 56 cases of marked nephritis, but 17 per cent. of the cases showed albuminuria. In 1911, they treated 1,984 cases and had 34 cases of marked nephritis with 18 per cent. of cases showing albuminuria.

They accounted for the small number of cases by the strict regime in diet, which was limited to milk or fluids for the first eighteen to twenty-one days, during which time the patients were kept in bed. For the treatment they relied on eliminatives and hot packs and hot baths. Maximum doses of nitroglycerin were given one-half hour before each pack as a vasomotor dilator to increase the diaphoresis.

DR. PHILIP D. KERRISON said that he had been asked to limit his remarks to the indications for mastoid operation in cases complicating infectious diseases. In the majority of cases the operation was undertaken not so much because of the urgency of the immediate symptoms as for the purpose of preventing certain dangers, viz., those inherent in a rapidly spreading suppurative mastoiditis which might endanger the patient's life, and the truly remarkable rapidity with which the drum membrane in these cases might be destroyed. As to the indications for operating, there were many conditions which made this the best course, namely, presence or absence of adenoids, the constitutional condition of the patient, the environment; so that it did not seem wise to lay down dogmatic rules for surgical intervention. This much was known, however: the so-called mastoid antrum was as large in a child as in an adult, while the mastoid

cortex was comparatively very thin. Any severe suppuration of the mastoid was likely, therefore, to be followed early by mastoid edema or subperiosteal abscess. Either of these conditions usually indicated the presence of pus within the mastoid cells. Postauricular redness or swelling in these cases might be regarded as positive indications for opening the mastoid. Again, where there was a red and infiltrated drum membrane through which a copious discharge persistently flowed they were obliged to operate on the mastoid for the purpose of preventing destruction of the ear. The list of indications might be extended, beginning with mastoid tenderness, sensitiveness to pressure, etc. The subject was one in which dogmatism should be avoided.

DR. THOMAS A. SMITH said he had been asked to discuss empyema following scarlet fever. During the past two years something like 6,300 cases of scarlet fever had been admitted to the Willard Parker Hospital, and among these there developed 17 cases of empyema, less than 3 per 1,000 cases. At no time during the past two years did the statistics give this complication as occurring in as many as 1 per cent. Empyema was a late complication of scarlet fever. It usually appeared in the fifth, sixth, or seventh week, and it might complicate a pneumonia or occur independently. The records showed that these cases of empyema were apt to be a part of a general septicemia. The mortality was high, not so much through the empyema *per se* as because this complication occurred in very young and very sick children. In adults and in older children satisfactory drainage of the empyema could be best accomplished by the excision of a section of one or more of the ribs. In the very young and very sick children, among whom the condition was met with in the Willard Parker Hospital, this procedure was not advisable. It seemed to him that an operation without the employment of an anesthetic was far preferable to one which entailed great shock. Drainage was satisfactory in these children without removing sections from one or more ribs.

DR. JOSEPH E. WINTERS said it was impossible to discuss intelligently the treatment of scarlet fever without bringing it down to the treatment of the individual case. One of the things for consideration in grave cases was the temperature; in the virulent cases there was high temperature, rapid pulse, delirium, vomiting and diarrhea, and when all were present they were uncontrollable. Sometimes the high temperature was best



treated by warm sponging; when this failed one should not hesitate to use cold packs. Dr. Winters reported the case of a nurse who had a temperature of  $106^{\circ}$  to  $107^{\circ}$  F., and the cold pack was used with almost magical effect. In another case the same treatment had no effect. In another case where there was wild delirium he had given one-third of a grain of morphin and one-eighth of a grain of strychnin hypodermically. This patient had a bad pulse. Within twenty-four hours the delirium had passed away and the patient made a good recovery. Sometimes large doses of alcohol were valuable, but these should never be given except late in the disease. In the treatment of adenitis, if seen at the very inception, ice should be applied, but should not be continued for more than twenty-four hours; if after that time the adenitis continued to increase hot flaxseed poultices should be employed. If the tongue was kept clean from the very beginning of the disease one would almost never see a case of adenitis. If a child was kept in bed with proper attention to the skin, proper diet, and proper location of the bed, nephritis would not develop. The best treatment for nephritis was purgation and diaphoresis, but digitalis should not be employed. Digitalis increased the distention of the afferent vessels and aggravated the pathologic condition. He preferred aconite, as in other congestions.

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THE NEW YORK ACADEMY OF MEDICINE.—SECTION  
ON PEDIATRICS.\*

*Stated Meeting, Held May 9, 1912.*

WILLIAM SHANNON, M.D., CHAIRMAN.

OSTEOGENESIS IMPERFECTA: REPORT OF A CASE, WITH THE STUDY  
OF ITS METABOLISM.

DRS. HERMAN SCHWARZ and MURRAY H. BASS presented this paper. They stated that the condition known as osteogenesis imperfecta did not enter into the symptom-complex known as fetal rickets. Attention had been called to cases character-

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\* Report furnished by the Secretary, Dr. Hoag.



ized by fragility of the bones by Lobstein in 1833. The greatest number of cases occurred during intrauterine life and were still-born. A few, however, survived and presented definite clinical characteristics. One group of these cases appeared to be normal at birth, but later on in childhood suddenly developed a tendency to multiple fractures from very little violence. Heredity seemed to be the only important etiologic factor. In one instance it had been noticed that the disease was present in one of twins, the other child being normal, and this would tend to show that the actual condition of the mother was not at fault and that the disease was a fetal one. Macroscopically, the bones showed fractures, the breaks being very numerous in some instances. The bones might be soft and pliable or very brittle and they might be either normal in length or short and plump, scarcely narrower in the middle than at the ends. The cortex of the bone was extremely thin. The bones of the skull were characteristic in that they were almost entirely devoid of calcification. The base of the skull was usually ossified, but was thin and friable. The ribs also were ossified, but showed irregularly distributed nodules representing previous fractures. Microscopically, the region between the epiphysis and diaphysis of the long bones showed normal relations in respect to the proliferation of the cartilage, the form, structure, and arrangement of the cells. Endochondral ossification *per se* proceeded normally, but was markedly reduced in amount. In the diaphysis one met with numerous thin cartilage remnants, but with very few bone trabeculæ. Periosteal ossification was entirely absent in certain places; in others it was slight. The periosteum was thin and the number of osteoblasts everywhere diminished; in the long bones the marrow was markedly increased. The children who survived with this condition were small, underweight, had long, silky hair, open fontanels and sutures, small faces, soft, delicate skin, protuberant abdomen without any evidence of umbilical hernia, and diastasis recti. The extremities showed all sorts of deformities due to fractures—bending, marked shortening, and curvature being the rule. The fractures seemed to cause very little pain and union took place rapidly. The X-ray appearance of the bones showed large medullary cavities with very thin atrophic cortex; epiphyseal lines showing up very sharply. The prognosis of the disease was bad. It was better in cases occurring late in childhood, and some cases seemed to undergo

spontaneous cure. The case reported was that of an infant seven months of age, whose family history was negative as to syphilis, tuberculosis, or any bone disease similar to this one. When the child was four days old the physician found a fracture of the thigh, but the mother knew of no other fractures. Except for underdevelopment and deformities, the child seemed normal. The head was abnormally large in comparison with the trunk and the extremities were small, shortened, curved and angulated. The sagittal suture was wide open. There was distinct exophthalmos. The nostrils were fine and delicate, the mouth small, lips thin, tongue slightly protruding, and the hair long and silky. The clavicles showed angular deformity. Lymph nodes the size of a pea were just palpable in the axilla and groin. The urine was clear, amber, acid, and showed no albumin or sugar. The blood showed hemoglobin, 60 per cent.; red blood cells, 4,512; white blood cells, 11,600; differential polynuclear leukocytes, 15½ per cent.; large mononuclears, 17 per cent.; small leukocytes, 64 per cent.; eosinophiles, ½ per cent. The Noguchi modification of the Wassermann reaction was negative. The child was placed in the Hoobler metabolism bed for six days and was fed on mixed human milk. The weight of the child at the beginning of the experiment was 4,300 grams. During the six days the child took 3,390 c.c. of milk, appeared to be in normal health, and the tables showed that nitrogen metabolism was normal. The excretion of creatinin nitrogen by the kidneys was low as compared to the findings of Amberg and Morril. The fat absorption and retention were perfectly normal. The calcium metabolism was of particular interest in the light of the disturbance in the ossification of the bones. The child, according to the tables, was retaining calcium to the extent of 45.7 per cent. of the intake. A comparison of this baby with others showed that a retention of 109 mgs. did not appear to be very low, the average retention being from 210 to 120 mgs. The positive calcium balance in this case might be construed in different ways. The disease might be considered at an end, as there had been no fractures since birth, and the calcium metabolism might be looked at as that of a normal child. But the cranial bones were still soft. The disease might be in the stage of repair, and this seemed likely, since there had been no fractures since birth. But, again, if the body was trying to replace lost calcium, there should have been a decidedly

greater retention of calcium than was present in the normal child. This was not the case. When one considered how complicated the whole calcium metabolism was, such a case as the one under discussion led one to speculate as to whether there was a distinct relationship between calcium retention and skeletal ossification. The retention of magnesium was 51 per cent., which showed very little variation from the other cases in which it had been determined by Blaubeurg. The phosphorus metabolism was practically normal, while both sodium and potassium were positive, but it was impossible to discuss their significance in view of the small number of existing analyses in normal infants. For the same reason the sulphur balance could not be adequately discussed.

#### SCLERODERMA IN AN INFANT.

DR. ROGER H. DENNETT reported this case. The history of the child showed that she was born on October 8, 1911, and weighed 6 pounds at birth. She was the first child of healthy parents, and, so far as could be ascertained, was perfectly normal at birth. When three days old she became very ill. In the course of a week the mother was told that she was not a normal child; all her joints were stiff. She recovered, however, and gained in weight. At the end of two months she still had rigidity all over the body and thickening of the skin and subcutaneous tissues. A physician who saw her at that time made a diagnosis of arthritis due to syphilis. The X-ray plates taken showed lack of ossification in the carpal and tarsal bones. The child was put on mercurial inunctions for about a month and did badly. This was of interest in view of the statement made by some authorities that scleroderma was aggravated by mercury. Dr. Dennett had first seen the child when she was three months of age. She then weighed 7 pounds and 12 ounces and seemed normal mentally. The skin over her entire body, with a few exceptions, was yellow, waxy in appearance, perfectly smooth, soft, moist, thickened, and indurated, not pitting on pressure. The fontanel was normal in size and the head well-shaped, with no thickening about the scalp. The arms were normal, the hands having a small amount of thickening on the dorsal aspect, and the fingers were held flexed like congenital club hand. The legs were held in the flexed position and could not be extended, even with a great deal of force. The medicinal



treatment was stopped and more frequent nursings given. The vomiting was controlled to a certain extent by paregoric. Very energetic massage was given to prevent ankylosis. The subsequent history of the case was not of great moment. Three weeks ago the administration of thyroid extract was begun; this was only because no treatment had as yet been satisfactory and because the induration seemed to resemble that of thyroid deficiency to some extent. This was not a common condition in infancy, the youngest case on record as far as the author could ascertain being that of a child thirteen months of age. The disease was apt to run a shorter course in children, and therefore the prognosis was better. This condition should not be confused with sclerema, the latter running a subnormal temperature and the indurated areas being of a bluish color, cold and clammy to the touch.

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THE RADICAL CURE OF HERNIA IN INFANTS AND YOUNG CHILDREN.—Kellock (*Proceedings of Royal Society of Medicine*, January, 1912) attaches considerable importance to the congenital origin of inguinal hernia in young children, so far as the sac, at any rate, is concerned, and thinks that the only "acquired" factor is the protrusion of some viscus into an already existing sac. He holds that operation can and should be done at an early age, and believes that a suitable procedure is one he has reduced to a very simple form. Some importance is attached to preparatory treatment. An infant who has a hernia of any size is kept for a few days before the operation in the Trendelenburg position, with the feet and legs over a wedge pillow, so that the hernia is kept out of the way. In the operation itself, an inch incision is made through the skin at right angles to the direction of the cord, and just above the external abdominal ring. This incision is well away from the genitals, and is accompanied by very little bleeding. The coverings of the cord being divided longitudinally, the sac is found, isolated, drawn down, transfixed and ligatured as high up as it can be reached, and the skin wound then closed.—*Universal Medical Record*.



## CURRENT LITERATURE.

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### ABSTRACTS IN THIS NUMBER BY

DR. T. WOOD CLARKE.	DR. C. D. MARTINETTI.
DR. CHARLES E. FARR.	DR. WILLIAM A. MURPHY.
DR. S. FELDSTEIN.	DR. WILLARD S. PARKER.
DR. J. S. LEOPOLD.	DR. RICHARD M. SMITH.

### PATHOLOGY.

BLACKFAN, KENNETH D.: APPARATUS FOR COLLECTING INFANTS' BLOOD FOR THE WASSERMANN REACTION. (*American Journal of Diseases of Children*, July, 1912, p. 32.)

The author describes an apparatus for the collection of blood for the Wassermann reaction. It consists of a glass cylinder connected with a test-tube and having also an attachment for a suction pump. The glass cylinder is applied over a small area of the skin which has been slightly scarified. The suction then draws the serum into the tube. By this means blood may be collected quickly and without the necessity of entering a vein.

RICHARD M. SMITH.

KOLMER, JOHN A.: LEUKOCYTIC "INCLUSION BODIES," WITH SPECIAL REFERENCE TO SCARLET FEVER. (*American Journal of Children's Diseases*, July, 1912, p. 1.)

The author describes the investigation of the so-called inclusion bodies of scarlet fever. These bodies are characteristically found in the protoplasm of polymorphonuclear leukocytes of scarlet fever patients near the margin of the cell and are not connected with the nuclei. They present no fixed morphology, but occur as rod and coccus forms. Early in the scarlet fever most of the polynuclear cells will be found to contain one or more of the bodies. After the sixth day in mild scarlet fever they may require careful search before being found. For examination ordinary blood smears are prepared on perfectly clean slides. They do not stain with eosin and hematoxylin. Methylene blue will bring them out. Differential stains show conclusively that the bodies did not contain chromatin and are not protozoan in nature. They represent a degenerative process of the cytoplasm and are probably composed of spongio-

plasm. Blood smears from 216 patients with scarlet fever were examined. Ninety-four per cent. of the cases during the first three days showed the presence of inclusion bodies. After this they diminish in frequency and are generally absent after the ninth day. Fifty patients with diphtheria were examined and 42 per cent. were positive during the first three days of the disease. After this they were seldom found. Thirty cases of serum sickness, presenting urticarial rashes, showed no inclusion bodies. Fourteen cases presenting scarlatiniform rashes were investigated; 5 diagnosed clinically as serum sickness did not show the bodies; 5 diagnosed as scarlet fever all showed the bodies; 2 diagnosed as scarlet fever did not show the bodies; 1 case of doubtful diagnosis showed the bodies; 1 case of gastrointestinal disturbance did not show the bodies; 12 cases of measles were negative; 11 cases of erysipelas, 7 were positive; 3 cases of pneumonia, 2 showed the inclusion bodies. Other additional cases of various diseases did not show the inclusion bodies. Inclusion bodies are, therefore, found not only in scarlet fever, but in other streptococcus infections.

RICHARD M. SMITH.

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## SURGERY.

ZAPPERT, JULIUS: ACUTE PAINFUL INFLAMMATION OF THE BREAST IN OLDER CHILDREN ("MASTITIS ADOLESCENTIUM"). (*Zeits. für Kinderhk.*, July 17, 1912, p. 353.)

Zappert calls attention to the fact that "mastitis adolescentium" is described in very few text books on diseases of children. It is a condition which is seen not infrequently in girls as well as in boys at about puberty. Seventeen cases are reported. The disease consists of a painful swelling of one or both breasts, with non-involvement of the axillary gland. The size of the swelling varies from that of a small nut to a small apple. At times the condition is extremely painful. As a rule both breasts are involved. Complete recovery usually takes place, but the entire process sometimes takes several weeks before cure is established. At times suppuration occurs and then the axillary glands become enlarged.

Zappert maintains that this is not a physiologic but a path-

ologic condition. For this reason he thinks the name "mastitis adolescentium" should not be used, but that the disease should be called "an acute painful inflammation of the breast in older children."

J. S. LEOPOLD.

OLIVIER, M. LE DR. EUGENE: TOPOGRAPHIC ANATOMY AND SURGERY OF THE THYMUS. (ANATOMIE TOPOGRAPHIQUE ET CHIRURGIE DU THYMUS.) (Paris: G. Steinheil, Editeur, 2, rue Casimir Delavigne, 2.)

This monograph of 152 pages, with two radiographs, sixteen illustrations, a complete bibliography, and resumé of all the reported cases of thymectomy, is the best work on the thymus gland in modern times. The author gives a very complete anatomic description of the thymus and its relations, and the symptoms and physical signs of hypertrophy of the thymus. After a full discussion of the various forms of surgical treatment, fixation, resection and fixation, resection and partial excision of the sternum, he concludes that the only surgical treatment should be sub-total thymectomy, performed within the capsule. The question of anesthesia is given careful consideration and general anesthesia with chloroform is adopted as the best. He says the anesthetic is very well borne. The technic of the operation is given in great detail and is said to be very easy of performance. He believes in a low, vertical, median incision. There is little or no hemorrhage and no drainage is employed. Tracheotomy is never used.

Of the 39 cases, personal and from the literature, there were 15 deaths, but the author is able to explain satisfactorily to himself, at least, this high mortality. Some of the cases were moribund at operation, and in others death was caused by unnecessary procedures, such as tracheotomy, partial excision of the sternum, the use of drainage, etc. The late results in the surviving infants were very favorable, nearly all being cured of their urgent symptoms. No unfavorable results as to the growth of the child and its development were observed, and this is borne out further by numerous experiments upon animals. Complete removal of the thymus, on the other hand, judging from the same evidence, would give a very high immediate mortality and eventual death to all. The various kinds of thymic asthma and their symptoms, with the indications for operation, are discussed

in the greatest detail, and the conclusion is reached that in all of the serious forms, except that accompanied by enlarged mediastinal glands, the operation of thymectomy offers a simple, safe and easy cure. The views expressed in this work are not the accepted views of American physicians, but the work is well written, the arguments are clearly stated, and are worth careful consideration by all who are interested in the subject.

CHARLES E. FARR.

TALBOT, F. B.: TUBERCULOSIS OF THE MESENTERIC GLANDS IN INFANTS AND YOUNG CHILDREN: ITS EFFECT ON ABSORPTION. (*American Journal of Diseases of Children*, July, 1912, p. 49.)

The author reports the study of cases of tuberculous peritonitis in so far as this disease affects the digestion and absorption of food stuffs. The carbohydrate and proteid metabolism is not disturbed, but owing to the presence of mesenteric glands which obstruct the lacteals the fat, though digested, is not perfectly absorbed. This is evidenced by the appearance of fat in the stools. He advocates regulation of the diet according to the stool findings, and reports the favorable progress of cases under this method of treatment.

RICHARD M. SMITH.

NOVÉ-JOSSERAND, G., AND RENDU, A.: EARLY TREATMENT OF TALIPES. (RÉSULTATS ÉLOIGNÉS ET VALEUR DE LA MÉTHODE DE FINCK DANS LE TRAITEMENT PRÉCOCE DES PIEDS BOTS CONGÉNITAUX.) (*Lyon Chirurg.*, Lyons, August, 1912.)

Finck's method has been used by the authors in the treatment of 30 cases of club-foot with very good results. The correction begins upon the day of birth, the massage being increased continuously from day to day and the gain in position controlled by a final bandage over a hard sole. The bandage is removed daily. The first attempt is made to correct the adduction of the metacarpus, and the supination, neglecting the equinus, which is corrected upon the second day. With increasing length and vigor of massage the malposition is soon overcome and retained, even when the bandage is removed. This may generally be accomplished in twelve sittings and the correct position is aided by means of elastic traction, the process being complete at the end of six months. The massage must be begun at birth, as the tissues are too firmly contracted at the end of two months for



effectual massage. Of the 30 cases, 50 per cent. resulted in perfect cure; a simple tenotomy was needed in 37 per cent., while in 12 per cent. arthrotomy was necessary, in addition to the massage.

CHARLES E. FARR.

V. BOKAY, JOHANN: INFANTILE LITHIASIS IN HUNGARY. (*Zeits. für Kinderhk.*, August 2, 1912, p. 365.)

Bokay has collected 1,836 cases of lithiasis in infants in Hungary; 667 of these cases occurred in Bokay's service in the Stefanie Children's Hospital in Budapest. Most of these 1,836 cases were in children between two and seven years of age and the great majority of cases during the third and fourth years of life; 45 cases occurred during the first year. The youngest case was two and one-half months of age. Of these 1,836 stones 1,319 were bladder stones, 9 kidney stones, 508 urethral stones. It is of interest to note that only 72, or 4 per cent., of these cases occurred in girls, and that Jewish children were rarely affected (3 per cent. of cases).

J. S. LEOPOLD.

ZYBELL, F.: PLEURAL EMPYEMA IN INFANTS. (ZUR KLINIK UND THERAPIE DES PLEURAEMPYEMS BEI SÄUGLINGEN.) (*Monats. für Kinderhk.*, Leipsic, July, 1912.)

Zybell reports 22 cases of empyema in children, all but 3 of whom were less than a year of age. He also quotes from Nathan and from Lewis Smith, who have observed a large number of additional cases. The diagnosis is difficult, as the physical signs are not as reliable as in adults. Exploratory puncture, which is without danger, even in the youngest children, is the only sure means of diagnosis and should be used in every doubtful chest case. The process has a marked tendency to extend to the lungs, the pericardium, the peritoneum, and to other parts of the body. In 15 of his 22 cases there were complications as follows: Purulent pneumonia was present in 7, while purulent endocarditis, purulent arthritis, or dry perisplenitis were found in 2 cases each, 4 had purulent otitis media, and 5 had general furunculosis and deep-seated abscesses. The onset of the empyema may be sudden or sometimes quite insidious. Dyspnea is the most marked symptom and is accompanied by a dry, harsh cough and more or less cyanosis. At times the alimentary symptoms are more noticeable, vomiting and diarrhea with loss of

weight and appetite. The temperature may be normal or slightly elevated and is no index of the condition. The pneumococcus is the infecting organism in most of the cases, but 3 of the author's cases showed streptococci, 1 showed both streptococcus and staphylococcus, and 1 case was tubercular. Zybelle does not believe in rib resection in infants. From the literature he found that 72 out of 82 cases in infants under a year were fatal, and 63 out of 84 cases in older children. He therefore uses simple puncture, repeated as often as necessary. Again from the literature he found that 27 of 31 cases were cured by this means. Of his 22 cases, 1 was found at autopsy. Two cases were treated by rib resection; both died. Five cases were drained by a rubber tube passed through a trocar; 4 died. One was treated by puncture and irrigation with salt solution; it died. Thirteen were treated by simple puncture, of whom 2 were moribund on entrance. Of the 11 remaining, 6 recovered. The mortality is certainly overwhelming with any kind of treatment, even according to the author's showing.

CHARLES E. FARR.

NEWBERGER, CHARLES: TETANUS AS A COMPLICATION OF BURNS. (*American Journal of Diseases of Children*, July, 1912, p. 34.)

The author reports 2 cases of tetanus following burns, and reviews the literature on the subject. From this he concludes that tetanus is not infrequently a complication of burns. The mortality is greatest in cases occurring during the warm months of the year. If burns are of the trunk the tetanus is more severe. The longer the incubation period the less the mortality. He advises prophylactic measures in all cases of serious burn.

RICHARD M. SMITH.

FIRTH, A. C. D.: HEREDITARY ABSENCE OF THE PATELLÆ AND DEFORMITY OF THE NAILS. (*British Journal of Children's Diseases*, July, 1912.)

Mal-development or absence of the patellæ may be divided into two groups—accidental or sporadic and hereditary. History of two families, illustrating, first, a normal father; mother, patellæ absent and nails deformed; oldest child, patellæ absent, nails deformed, both radii dislocated. Second, twins, died soon

after birth, no history of deformity. Third, normal boy. Fourth, girl, no patellæ, cleft palate. Fifth, girl, rudimentary patellæ, deformed nails. Sixth, patellæ absent, nails deformed, congenital dislocation of hip. Seventh, normal girl. No history further back than mother can be traced.

Second family history negative for this deformity. Father is strong and healthy, mother healthy, but both patellæ are absent and finger and toe-nails are defective. The first, fourth, seventh, eighth and tenth children were normal for the deformity; 4 had a congenital hernia and 8 rickets, however. Second, third, fifth and ninth have absence of patellæ and deformed nails. Sixth has rudimentary patellæ, ptosis of right eye and a cross horizontal nystagmus.

WM. A. MURPHY.

VARIOT, M. G.: CONGENITAL HEMIATROPHY OF THE FACE AND TONGUE ON THE LEFT SIDE; ABSENCE OF STERNOMASTOID MUSCLE AND CERVICAL HERNIA OF THE LUNG. (HÉMI-ATROPHIE CONGÉNITALE DE LA FACE ET DE LA LANGUE A GAUCHE. ABSENCE DU MUSCLE STERNO-CLÉIDO-MASTOÏDIEN ET HERNIE CERVICALE DU POU-MON DU MEME CÔTÉ.) (*Société de Péd. de Paris*, March, 1912.)

Report of a boy, five and one-half years old, about three and one-half feet tall, of normal intelligence. The head, without muscular rigidity, was inclined to the right side. While skull was symmetrical, the left side of face was less developed than the right, as well as the ramus of the lower jaw on that side. The mouth was not symmetrical, and when he spoke or opened it the right corner was markedly drawn down. When the tongue was protruded it deviated to the right, but did not interfere with distinct enunciation of words. Right sternomastoid muscle was normal. There was a hernia varying with respiration on the left, near claviculo-sternal articulation.

WM. A. MURPHY.

HUSSY, A.: HELIOTHERAPY OF SURGICAL TUBERCULOSIS. (DIE SONNEN UND FREILUFTBEHANDLUNG DER CHIRURGISCHEN TUBERKULOSE IM HOCHGEBIRGE.) (*Cor.-Blatt für Schweizer Aerzte*, Basel, June, 1912.)

The author, who has been a house surgeon under Rollier and has also recently visited Calot at Berck, gives a very interesting summary of their treatment of surgical tuberculosis. Rol-

lier's chief reliance is upon sunlight, while Calot's is upon fresh sea air. Both are thorough believers in immobilization in bed for all patients, until such time as the X-ray shows the lesion to be healed. Calot relies on plaster casings, while Rollier uses extension wherever possible. Calot was formerly very radical in his treatment of surgical tuberculosis, but has now changed completely to the opposite view. He says: "The knife rarely cures, often aggravates and always mutilates." Rollier gives all his patients a few days' rest in bed and then begins the sunlight treatments, gradually increasing the time of exposure and the amount of the body exposed until finally the patients lie all day in the open air, the head only protected and take the sunbaths for hours at a time. The wounds are simply covered with sterile dressings and occasionally Bier's treatment or the ultra-violet rays are used. Each patient has a gallery to himself, where he can lie naked, exposed to the light, all day, and all night if he wishes. Catching cold is a very rare phenomenon.

CHARLES E. FARR.

OCHSNER, A. J.: TREATMENT OF HERNIA IN CHILDREN. (*The Journal of the American Medical Association*, September, 1912.)

Ochsner believes that the development of hernia in children is caused (1) by faulty development of the abdominal wall, (2) insufficient strength in the tissues which close the rings, (3) abnormal intra-abdominal pressure, (4) open tunica vaginalis. Conditions (1) and (2) are hereditary. The increased pressure may be due to gaseous distention from improper feeding, or to the exertion caused by phimosis, by severe coughs, by vomiting, rarely by traumatism. Ninety-five per cent. of all hernias in children will heal spontaneously if the sac is kept empty and the abdominal pressure relieved. Trusses may be used or the child may be kept in bed with the foot of the bed elevated for about six weeks. The general hygiene and diet of the child must be regulated, constipation avoided, phimosis relieved. Operation is indicated in strangulated hernia, irreducible hernia, hernias with large rings, especially if hereditary, in reducible hydrocele, in undescended testis. In all of the cases operation should consist simply of removing the sac and closing the skin wound, except when the rings are very large, when the Ferguson-An-



drews operation is indicated. The bed position as given above is very useful in the postoperative treatment also.

CHARLES E. FARR.

KERR, LE GRAND: SURGERY FROM THE PEDIATRIC STAND-POINT. (*Medical Record*, June 22, 1912.)

Kerr states that the child's immature organism reacts very differently from the adult's in respect to injury, disease and infection. The pediatricist and the general practitioner should be given a much larger place in the activities and deliberations of the surgeon. Of a special interest in a diagnostic way in children is appendicitis. Acute appendicitis is frequently diagnosed when the true condition is right-sided pneumonia, distention of the bladder, intestinal parasites, etc. The mere presence of right-sided abdominal pain should not lead one to make the diagnosis, unless other cardinal symptoms are present. On the other hand, many cases of chronic appendicitis are improperly diagnosed as digestive disturbances, bilious attacks, etc. This is a problem for the general practitioner rather than the surgeon, as he has far greater opportunities of observation. CHARLES E. FARR.

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## MEDICINE.

SEZARY, A.: ERYTHEMA NODOSUM AND TUBERCULOUS MENINGITIS. (*Medical Press and Circular*, July 10, 1912, p. 32.)

The close relationship between erythema nodosum and tuberculosis is now well known. This was first pointed out clinically, and attempts to prove it anatopathologically have not been very successful. The clinical evidence, however, is convincing. In considering the future of a child that has had erythema nodosum, the increased liability to tuberculous meningitis must be borne in mind. Many cases of tuberculous meningitis give a history of attacks of erythema nodosum. Some authors not only think that the two diseases are associated, but claim that the erythema nodosum is in reality an early symptom of the more grave disease. As the attack of erythema nodosum may antedate the meningitis by many months, its appearance may indicate prophylactic treatment which will prevent the development of the meningeal infection. There are two hypotheses as to the nature of

the relation of the two diseases. The skin eruption may be of direct toxic or bacillary origin due to the tubercle bacillus. On the other hand, the cutaneous lesion may be a peripheral manifestation of the affection of the central nervous system, similar to the angioneurotic edema or purpura. It is thought by some to be the only visible symptom of an imperfect meningeal syndrome. However, this may be with regard to the question of pathogenesis, it is our duty to bear in mind the fact that tuberculous meningitis is a common sequel of erythema nodosum, so that our prognosis should be extremely guarded.

T. WOOD CLARKE.

WILLIAMS, LOUIS L.: SALVARSAN AND MEASLES: A CLINICAL NOTE. (*Boston Medical and Surgical Journal*, May 16, 1912, p. 738.)

Williams reports a patient of twenty-two suffering from secondary syphilis who was given, on March 31, 1912, 0.6 gram salvarsan intravenously. On April 2d, after mild coryza and moderate fever, the patient developed typical measles, which ran a normal course.

The salvarsan was given then but a few hours before the onset of measles and the case affords some evidence that salvarsan does not affect the development and course of that disease. In view of the antagonism of salvarsan to some of the pathogenic protozoa the above coincidence may have some bearing upon the question of the nature of the etiologic factor in measles.

WILLARD S. PARKER.

SILVESTRI, T.: SYPHILIS AND SCARLATINA. (*Gazz. Osped. e Clin.*, August 3, 1911.)

It is a well-known fact that syphilis predisposes to various forms of tuberculosis, whose course is usually very malignant. If tuberculosis existed before the contraction of syphilis prognosis is invariably bad. Silvestri had a patient, a child, suffering from hereditary syphilis who developed scarlatina. Strange to say, all the syphilitic manifestations improved greatly. Enlarged lymphatic ganglia disappeared and malnutrition was no longer evident. Wassermann's test, formerly strongly positive, became negative. The same changes took place in another patient, an adult. Silvestri infers that by some unknown relation between

the two infections scarlatina virus is able to paralyze the effects of treponemata, thus giving the general improvement noticed.

C. D. MARTINETTI.

WEBER, F. PARKES: DIABETES INSIPIDUS IN A BOY WITH POSITIVE WASSERMANN. (*British Journal of Children's Diseases*, May, 1912.)

Boy, aged ten years; height, 115.5 cm., 15 cm. below normal, and weight, 19 kilograms, 10.4 below normal, suffered with polyuria and polydipsia since third year. Average 4,000 c.c. in twenty-four hours, with specific gravity 1,001-1,004. Thyroid appears to be small. Skiograph of skull showed sella turcica normal. Treatment by thyroid feeding and mercurial inunction gave a negative result.

WM. A. MURPHY.

O'CARROLL, J. F.: ON A CASE OF MENINGITIS DUE TO THE BACILLUS TYPHOSUS. (*Medical Press and Circular*, June 19, 1912, p. 646.)

The author reports the case of a boy aged nine years, admitted to hospital as a case of typhoid fever. Abdominal pain, coated tongue, sordes, distention of abdomen, temperature, 102.4°F.; pulse, 128; respiration, 36. The spleen was not enlarged and no rose spots were seen. He was dull and listless and resented handling. The Widal was positive. Lumbar puncture on the seventh day was negative. His condition improved until the sixteenth day, when he had a rigor, developed rigidity of the neck, and Kernig's sign. On the nineteenth day lumbar puncture obtained a few c.c. of turbid fluid containing 1,100 leukocytes per cmm., two-thirds of which were polynuclear cells and one-third lymphocytes. The typhoid bacillus was isolated. The patient died on the twentieth day. The post-mortem examination showed congestion, but no ulceration of the intestinal lymphoid tissue. The spleen was quite normal. The meninges and convexity of the brain were covered with a greenish-yellow exudate. Over the occipital lobes the exudate was hemorrhagic. It contained the typhoid bacillus. The author concludes from the normal condition of the intestines and the spleen that the case was one of primary typhoid meningitis. Meningeal complications of typhoid fever are not very uncommon and are not necessarily fatal.

T. WOOD CLARKE.

FISCHL, RUDOLPH: RACHITIS. (*Zeit. für Kinderhk.*, August 2, 1912, p. 389.)

The earliest symptom of rachitis in infants is intense sweating of the head. Then in order named appear the following symptoms: distended abdomen, craniotabes, rosary, square-shaped head, caput natiforme and enlargement of the epiphyses. Usually the last symptom to appear is bowing or bending of the extremities. According to Fischl's observations rachitis is most frequent between the tenth and twelfth months of life. One hundred and nine cases of rachitis were followed closely and treated with phosphorus and cod-liver oil (R phosphor, 0.01; ol. morrhuae ad 100.0  $\mu$ ) in teaspoonful doses, according to the teaching of Kassowitz. Fischl considers this the only preparation that does good in rachitis. Nearly all of his cases showed marked improvement under this treatment. Phosphorus and cod-liver oil are also a specific for tetany.

J. S. LEOPOLD.

SHEFFIELD, H. B.: EMPHYSEMA CUTIS-SCLEREDEMA NEONATORUM. (Reprint *Medical Record.*)

A case of bronchopneumonia following measles, with rupture of pulmonary alveoli and escape of air into subcutaneous tissues. Patient three and one-half years old, features entirely effaced, lips bluish black and moving rhythmically with inspiration and expiration. Respiration, 80; pulse, 150; temperature 102.5°F. Patient recovered.

Normal, full-term child; weight, 8 pounds; free from congenital syphilis, with no local infections. Edema appeared on the sixth day and gradually extended even to soles of feet and palms of hands. Urine negative. Temperature, 97°F.; no heart lesion. Cleared up on treatment with pot. acet. and inf. digitalis.

WM. A. MURPHY.

TREMBUR, F.: LUMBAR PUNCTURE IN THE DIAGNOSIS OF TUBERCULOUS MENINGITIS. (*Bull. Institut. Pasteur*, August 15, 1911.)

The serum extracted from the spinal cavity is placed in a thermostat at 37°C. for twenty-four hours. If the sediment, after being colored, is examined microscopically and shows bacilli the diagnosis of tuberculous meningitis is certainly positive.

C. D. MARTINETTI.



SHEFFIELD, H. B.: TUBERCULOUS PERITONITIS. SARCOMA OF KIDNEY. (Reprint *Medical Record*.)

Girl, fifteen months, father had pulmonary tuberculosis; breast-fed for two or three months, afterward on cow's milk; subject to "colds." v. Pirquet negative, no diarrhea or progressive anemia. Through abdominal incision a pint of serofibrinous fluid removed, also showed presence of tubercular nodules throughout abdomen. Incision healed by first intention and child has remained well since.

A twenty-three months old child, with large tumor in abdomen, marked edema of lower extremities, without hematuria, negative history. Postmortem showed tumor springing from right kidney, 5 to 6 pounds in weight. WM. A. MURPHY.

POTTENGER, FRANCIS MARION: THE RELATIONSHIP BETWEEN THE INFECTION IN THE CHILD AND CLINICAL TUBERCULOSIS IN THE ADULT. (*American Journal of Children's Diseases*, July, 1912, p. 13.)

The author attempts to answer the question, What is the subsequent history of the child who received tuberculous infection before the fifteenth year? A small percentage develop tuberculosis and die quickly. Another small per cent. develop chronic tuberculosis. Another group show no definite recognizable symptoms that have been heretofore considered as due to tuberculosis. A great majority remain free from symptoms and develop in a normal manner. He quotes from a previous paper in which he showed that clinical observations and experimental results warrant the assertion that an individual who has a tuberculous lesion already present in the body develops a marked protection against further inoculation with bacilli, and that if further extension of the disease is to occur from the focus already within the body, or a new infection is to occur from without, it must be by an inoculation of sufficient bacilli to overcome the increased protection which is present as a result of the previous infection. The clinical history of tuberculous patients when carefully analyzed leaves little doubt that the disease as it presents itself is either a new activity in, or an extension from, an old focus. The preponderance of clinical evidence throws our clinical tuberculosis in adults back to early infections of childhood. Therefore, the disease must be stamped out by making

the individual immune to infection or by curing the infection when it has occurred, thus preventing it from reaching the open stage. He believes that the prevention will come through vaccination. About 75 per cent. of children are infected before they reach the fifteenth year. Not more than 20 per cent. develop clinical tuberculosis. Not more than 10 to 15 per cent. die of the disease. Therefore, the child has three chances out of four of never showing evidence of the infection and six chances out of seven of not dying of the disease. The skin tuberculin reaction gives us an accurate means of diagnosing tuberculosis in infants. It is the physician's duty to seek out these children who are infected and put them on a hygienic regime which will favor a natural physical development. Those showing signs of active disease should be treated with tuberculin.

RICHARD M. SMITH.

SHEFFIELD, H. B.: MEGACOLON CONGENITUM ATRESIA ANI ET INTESTINI RECTI. (Reprint *Medical Record.*)

(1) At operation on a child, with persistent constipation and meteorism, beginning at six months, there was a descending colon, dilated, cornet-shaped and  $6\frac{1}{2}$  inches in circumference. Below sigmoid the intestine was normal in size and shape.

(2) Monstrosity; difficult labor; head soft and deformed, contracted forearms and shortened legs with talipes varus-scrutum and contents absent; thick imperforate skin for penis and no anus. The intestine terminated in a blind pouch; kidneys and bladder were rudimentary. The second child of same mother showed slight deformity of ears and fingers, otherwise normal.

WM. A. MURPHY.

ANDERSON, JOHN F., AND GOLDBERG, JOSEPH: RECENT ADVANCES IN OUR KNOWLEDGE OF MEASLES. (*American Journal of the Diseases of Children*, July, 1912, p. 20.)

The authors report experimental work as to the infective agent in measles. Previous work would indicate that the period of infectivity of the blood begins at least twenty-four hours before and continues for about twenty-four hours after the first appearance of the exanthem. The virus in measles is capable of passing through a Berkefeld filter, and it may resist dessication for twenty-five and one-half hours. Its infectivity is de-

stroyed by heating at 55°F. for fifteen minutes. It resists freezing for twenty-five hours and possibly retains some infectivity after keeping twenty-four hours at 15°C. The nasal and buccal secretions are infective to the monkey at the time of the first appearance of the eruption and again forty-eight hours later, but not after that time, which would strongly suggest a reduction of activity with the approach of convalescence. Desquamating epithelium in measles does not in itself carry the virus of the disease. It was not possible to grow cultures of an organism bearing an etiologic relation to the disease.

RICHARD M. SMITH.

SHEFFIELD, H. B.: ATYPICAL INCIPIENT POLIOMYELITIS AND ITS DIAGNOSTIC DIFFICULTIES. (Reprint *Medical Record*.)

A report of 3 cases of infantile paralysis with unusual onsets and marked paralyzes not limited to extremities. One was thought to be cerebrospinal meningitis, another grip; the third resembled tuberculous coxitis.

WM. A. MURPHY.

SHEFFIELD, H. B.: BILATERAL ANOPHTHALMOS. AMAUROTIC IDIOCY. (Reprint *Medical Record*.)

The first case was a child of eight months. The second appeared, or was noticed first, at six months in the child of Austrian-Hebrew parents, with two older normal children.

WM. A. MURPHY.

SHEFFIELD, H. B.: PRIMARY SPLENOHEPATOMEGALY IN BROTHER AND SISTER. (Reprint *Medical Record*.)

In a family of four children the first and third showed this condition, with the other two apparently healthy and normal.

WM. A. MURPHY.

HOOBLER, B. R.: THE STANDARDIZATION OF BLOOD PRESSURE READINGS BY MEANS OF AN AUTOMATIC DEVICE FOR INDICATING SYSTOLIC AND DIASTOLIC PRESSURES IN CHILDREN. (*American Journal of Diseases of Children*, July, 1912, p. 47.)

The author describes the use of an apparatus for measuring blood pressure which eliminates the personal equation. He cites observations in which there was a variation between three read-

ings of 30 mm. of mercury for the systolic and 40 of the diastolic pressure. The apparatus has been previously described. Briefly, it consists of substituting a visible observation of the vibration of a pith ball for the sensation of touch. By its use blood pressure readings may be standardized. The apparatus is simple and compares very closely in efficiency with the Ehrlanger instrument. It is of use especially in children, since it can be used on the leg as well as on the arm. RICHARD M. SMITH.

SOLGE, B.: THE REACTION OF THE BLOOD SERUM IN ALIMENTARY INTOXICATION OF NURSINGS. (*Zeits. für Kinderhk.*, March 29, 1912, p. 92.)

It has recently been shown that the nursling is less able to maintain the physical constants of its blood serum than is the older child. In severe metabolic disturbances, as alimentary intoxication, there is found an increase in the albumin content of the blood serum, a rise in the freezing point, a loss of fluid and of inorganic salts.

Estimating the hydrogen concentration of the blood by the gas-chain method of Michaelis and Aberhalden, Solge found in 10 nurslings with chronic nutritional disturbance nephritis and convulsions. Solge found an average value of  $H = 4.2 - 4.9 \times 10^{-8}$ . These values corresponded to the values determined by Höber and by Pfaundler. In a fatal case of alimentary intoxication in a five weeks old infant, Solge found a hydrogen concentration of  $1.435 \times 10^{-5}$ , a marked increase above the normal. The albumin content of the blood serum was also increased to 10.3 per cent.

Solge concludes that an actual acid poisoning exists in this condition. WILLARD S. PARKER.

MOLTSCHANOFF, W. J.: THE V. PIRQUET REACTION IN ACUTE INFECTIOUS DISEASES. (*Jahrb. für Kinderhk.*, April 5, 1912, p. 435.)

The reaction was negative during the exanthem period in 17 cases of measles that subsequently reacted positively during convalescence. The height of the temperature or the presence of complications did not seem to influence the result. Seventeen of 20 positive scarlet cases failed to give a reaction during the period of eruption. Contrasted with these are the results ob-



tained in the diphtheria cases. It was positive in 14 out of 16 cases during the acute stage. In the few cases of varicella and angina the reaction was not affected. In explanation of these results various theories have been advanced. v. Pirquet attributes it to absorption of ergins in measles, with consequent susceptibility to tuberculous infection. But the fact that the reaction disappears in scarlet and other diseases which do not specially predispose to tuberculosis speaks against this view. Neumark and Nothmann attributes the disappearance of the re-reaction to leukopenia. The author, however, shows that there is no parallelism between the reaction and the number of leukocytes. He inclines to the view first advanced by Escherich, that it is due to changes in the skin brought about by the eruption.

S. FELDSTEIN.

SHEFFIELD, H. B.: TETANISM. (Reprint *Medical Record*.)

Tetanism in a breast-fed baby weighing 6 pounds at birth, which weighed  $3\frac{1}{2}$  pounds at eight weeks, senile face, spasms, etc. Recovered on reduced breast feedings followed by malt-soup mixture.

WM. A. MURPHY.

SELIGMANN, E., AND SCHLOSS, E.: ON DIPHTHERIA. (*Zeits. für Kinderhk.*, September 6, 1912, p. 451.)

In a very extensive article Seligmann and Schloss call attention to the great frequency of nasal diphtheria in infants and the ease with which this disease is transmitted from infant to infant in hospitals and asylums. The diphtheria bacillus remains at times for many months in the nose of infants and in this way may be the source of severe epidemics of diphtheria. Cultures should be taken from time to time of all infants in institutions, and the positive cases isolated and treated so as to avoid serious outbreaks.

In cases of nasal diphtheria antitoxin is at times of very little use. There is no question that antitoxin limits the disease and prevents extension to the pharynx and larynx, but for the nasal discharge itself, antitoxin and other local therapy are often of no benefit.

As a prophylactic measure antitoxin does very good service for a period of about fourteen days, but on account of the dangers of anaphylaxis in institutions at least prophylactic doses should

not be given. In severe cases of diphtheria in infants antitoxin should be given intravenously, and the best method is through the veins of the head, which are very prominent in infants.

JEROME S. LEOPOLD.

ALLAN, J.: MORBILLIFORM RASH IN CHILDREN. (*British Journal of Children's Diseases*, March, 1912.)

In a girl thirteen years, following tenotomy under a general anesthetic (ether and chloroform), there developed in forty-eight hours a rash resembling measles without affecting the face or associated coryza or other symptoms. No cause could be assigned, but it subsided with the use of a weak boric acid solution in irrigating the eyes for an inactive kerato-iritis. Original strength was 10 grains to the ounce.

WM. A. MURPHY.

AVIRAGNET, M.: GANGRENE OF A LIMB FROM AN EMBOLISM IN A CASE OF MALIGNANT DIPHTHERIA. (UN CAS DE GANGRÈNE EMBOLIQUE D'UN MEMBRE CONSÉCUTIVE A UNE ANGINE DIPHTÉRIQUE MALIGNÉ.) (*Société de Pédi. de Paris*, March, 1912.)

In a boy of thirteen, the membrane did not entirely disappear from the pharynx until after eight days, though given large doses of serum. Fourteen days after admission he developed violent pains in abdomen, colicky in character, with tingling sensation in the legs, especially the right, and absence of pulsation in the external iliac, femoral and popliteal arteries. He died the second day.

WM. A. MURPHY.

MCCRICK, T.: PURPURA FULMINANS AS A SEQUELA OF SCARLET FEVER. (*British Journal of Children's Diseases*, April, 1912.)

A report of a well-marked case in a boy of five years, which developed in the second week of scarlet fever. He was apparently in satisfactory condition, fairly well nourished, tonsils slightly enlarged, mouth clean, heart negative, with usual desquamation of trunk and limbs. Vomited and was restless in afternoon, discoloration appeared at 4 A.M., with increased pulse and respiratory rate. Progress was rapid and death occurred in twenty-four hours. Of 64 reported cases, 17 have been subsequent to an attack of scarlet fever in second, third or fourth week.

WM. A. MURPHY.

## INFANT FEEDING.

REUSS, A. v.: UNDERFEEDING IN THE EARLY DAYS OF LIFE. (*Zeits. für Kinderhk.*, September 6, 1912, p. 499.)

Reuss reviews very thoroughly the literature on underfeeding in infants and reports numerous cases, from which he draws the following conclusions:—

If sufficient fluid is given to infants during the first few days of life a normal gain in weight results, even if sufficient breast milk is not given.

Underfeeding in infants may be due to the infant itself (weakness in sucking, inability to suckle, etc.), or to the mother (nipples which are difficult to grasp, a breast which is difficult to suckle, or a diminished amount of milk), or it may be due to a combination of the two. Treatment depends upon the cause of the condition.

Except in the case of weak infants, only five, or, at the most, six, feedings should be given in twenty-four hours. This method of feeding is best both for the child and for the mother. In case the infant is not getting enough milk from the breast it should be given water in expressed breast milk to make up for the deficiency. The best way to empty the breast in the first few days is by means of the breast pump. In case the breast is not secreting enough milk, cow's milk should not be added to the infant's diet until the second week of life, inasmuch as underfeeding is very well borne in the first days of life. In case a rise in temperature should occur in the infant, water should be given to make up for the lack of fluid which, without doubt, has caused the temperature.

At six months of age Reuss advises the addition of artificial feeding to the breast feeding. Breast feeding should be discontinued at about nine months. JEROME S. LEOPOLD.

BENFEY, A.: FEEDING OF THE NEWBORN WITH ALBUMIN-MILK. (*Jahrb. für Kinderhk.*, March 5, 1912, p. 280.)

According to Schelble and Grosser the artificial feeding of the newborn with the usual milk mixtures has proved unsuccessful in over 50 per cent. of the cases. Contrasted with these are the early figures of Finkelstein and Meyer with albumin-milk. They failed in only 19.2 per cent. The author's work is a continuation of that of Finkelstein and Meyer on the use of albu-

min-milk at this period of life. It is based on the feeding of 83 infants not over three weeks old at the Berlin Waisenhaus and Kinderasyl. The ages were one week, 22 cases; two weeks, 50 cases; three weeks, 10 cases; unknown age, 1 case. Cases suffering from various infections are separated from those that were free from infection. The results are classified under three heads: (1) Complete failure. (2) Gain after a more or less prolonged period of lack of gain or even loss. (3) Gain from beginning.

Of the 44 cases without infection, only 1 was a complete feeding failure. This was a premature baby, two days old, with marked edema and intense cyanosis of the extremities, that died four weeks later of toxic symptoms. Thirty-two did not gain at first; in 2 it was due to lack of appetite; in the other 2 to the use of cane-sugar instead of maltose, and in the remainder to deficient amount of sugar.

Of the 39 cases with various infections, there were 7 deaths (18 per cent.), but 6 of these were not due to alimentary causes. Complete failure resulted in only 4 (10.2 per cent.). In 19, after a period of fluctuating weight, definite gain finally set in. Uninterrupted gain from the beginning occurred in 9 cases (23 per cent.).

The daily quantity was 150 to 200 c.c. per kilogram of body weight. The initial sugar (maltose) percentage should not be less than 5. If no gain occurs it should be increased to 6-7-8 per cent. in the absence of gastrointestinal disturbances. Employed in this manner albumin-milk is superior to all other artificial mixtures in the feeding of the newborn.

S. FELDSTEIN.

BECK, CARL: ALBUMIN-MILK IN GASTROINTESTINAL DISEASES OF CHILDREN. (*Jahrb. für Kinderhk.*, March 5, 1912, p. 315.)

The author treated 175 nurslings with albumin-milk—95 cases at the Neufville Hospital in Frankfort, 20 in the out-patient department, 45 in a babies' home, and 15 in private practice. There were 12 deaths; 4 were moribund when treatment began; 4 died of bronchopneumonia; 3 of a very severe decomposition, and 1 of toxic catarrhal enteritis. The cases included 110 dyspepsias, 8 toxic catarrhal enteritis, 40 enterocolitis and 17 decompositions. All forms were favorably influenced by the use of albumin-milk. It offers the advantage that within a short time sufficient nourish-



ment can be given without recurrence of symptoms of intestinal fermentation. The danger of inanition is thus lessened and the period of convalescence hastened.

The author advises rapid increase in quantity up to 200 c.c. per kilogram, even when the stools remain abnormal, the loss of weight continues and the general condition does not improve. Improvement ultimately takes place with the continued use of increasing quantities of albumin-milk. In most cases dry, fatty stools appear after one to two days. With this the loss of weight is checked and convalescence begins promptly. If loss of weight continues despite increase in quantity of albumin-milk, carbohydrates should be added. If during convalescence symptoms of fermentation recur, the quantity of albumin-milk should not be decreased.

S. FELDSTEIN.

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## BOOK REVIEWS.

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FOURTH SCIENTIFIC REPORT OF THE IMPERIAL CANCER RESEARCH FUND. Under the direction of the Royal College of Physicians of London and the Royal College of Surgeons of England. By DR. E. F. BASHFORD. London: Printed and Published by Taylor & Francis, Red Lion Court, Fleet Street, E. C.

The Fourth Scientific Report of the Imperial Cancer Research Fund is a volume of 223 pages, beautifully gotten up and illustrated with numerous charts, photographs and drawings. The body of the work is too full of meat to be abstracted and must be seen and studied to be appreciated. Suffice it to say that it contains evidence of an immense amount of original work conducted with the most painstaking care. The results of the work are well expressed for the busy reader in the brief introduction by Doctor Bashford, the director of the laboratory.

The three papers in the Report, which constitute only a portion of the actual work done, are on (1) spontaneous cancer in mice, (2) cancerous ancestry and cancer in mice, and (3) the behavior of tumor cells during propagation. New facts are brought forward in support of the view that a malignant new growth arises from local causes in a circumscribed area, and that the relation of each malignant new growth to the affected animal is an individual one, like that between the organs of the

body and the organism as a whole. The existence of hereditary predisposition to the development of spontaneous cancer is apparently well established. Great variations in individual growths are noted and it is inferred that corresponding variations in the growth of normal cells under the influence of chronic irritation may be responsible for some forms of cancer. Benign and malignant new growths have been carefully studied in their relation to each other and to normal tissue and the difference between benign and malignant new growths is seen to be purely arbitrary. The individuality of cancer, both as regards the organism attacked and the tumor itself appears at last to have been placed beyond all further doubt and a long step has thus been taken in defining a direction in which the future investigation of cancer is likely to be profitable.

The rôle of chronic irritation is evidently a mediate cause of cancer production and that for only certain forms and in particular parts of the body. Heredity also plays a part in affecting the liability to the development of cancer, but this does not consist in the inheritance of a soil more suitable for the growth of cancer in general. It is probably a local or circumscribed tissue predisposition and the influence of heredity in the general population is shown as an average predisposition of low general intensity. The warning is again given as regards immunity, that a high degree of resistance to the transplantation of cancer does not at all prevent the spontaneous development of the disease. As yet we are entirely unable to modify by this means the growth of cancer in the animal naturally affected. This fact alone reveals the marked distinction between cancer and the infective diseases.

The report as a whole is extremely well worth reading.

CHARLES E. FARR.

FIFTH SCIENTIFIC REPORT ON THE INVESTIGATIONS OF THE IMPERIAL CANCER RESEARCH FUND. Under the direction of the Royal College of Physicians of London and the Royal College of Surgeons of England. By DR. E. F. BASHFORD. London: Printed and published by Taylor & Francis, Red Lion Court, Fleet Street, E. C.

The fifth report of the Cancer Research Fund is a worthy successor to the preceding reports, and, although no startling dis-

coveries have been made, steady progress is seen in many directions. The work of the fund has been considerably hampered by the removal of the laboratories to new and better quarters, and it is confidently expected that from now on more rapid progress will be made. Among the facts which have been developed, the increased percentage of mammary cancer in the female mice whose mother or grandmother also had cancer, over those of clean history is quite noticeable (16 per cent. as compared to 8 per cent.). While the fourth report dealt with the nature of cancer and its relation to chronic irritation, the present one deals, for the most part, with the nature of the resistance which may be developed against the growth of inoculated cancer. A certain degree of artificial immunity results from inoculation of animals with portions of tumors or with certain normal tissues, a fact very hopeful in the study of the biology of the cancer cell and possibly in the treatment of cancer. The questions at present under consideration are (1) the above mentioned immunity by inoculation with various tissues, (2) the question of the types of immunity, active or passive, and (3) whether the immunity produced by normal tissue implantation is identical with that produced by tumor tissue. The evidence so far given seems to prove that immunity is only produced by implantation of tumor or normal tissue of the same species, and, further, that starvation immunity does not exist. The transplanted tumors vary in two remarkable ways—(1) as to their power to produce immunity, and (2) as to the tumor's susceptibility to this immunity. These qualities appear to be inherent in the tumor cells themselves, and on them depends their power of arresting tumor growth. Recession is seen in spontaneous as well as transplanted tumors, although much more rarely in the former. Its cause in both appears the same, that is, a change in the relationship between the epithelium and the connective tissue, the cancer cells losing their malignant character and being overwhelmed by the connective tissue. This change in the malignancy of tumor cells cannot as yet be induced experimentally.

The report, while too technical, perhaps, for the busy reader, is, as usual, wonderfully well written and beautifully illustrated with numerous charts, photomicrographs, drawings, etc., and will well repay careful study by the many who are especially interested in this subject.

CHARLES E. FARR.

# ARCHIVES OF PEDIATRICS

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## EDITORIAL.

### A GRAPHIC FEEDING CHART.

"There are more things in heaven and earth, Horatio,  
Than are dreamt of in your philosophy."

There are some pediatricists who use percentages in their infant feeding, some who resort to calories, and some who are content to know what quantity of this and that their formulas contain. There are some who swear by top milks—a few, even, who persist in the extreme of top ounce or two from several bottles, with serene disregard of their patient's pocketbooks and other things—there are some who confine themselves to whole milk and there are others who use cream and skimmed milk. Some of our brother physicians love the algebraic formula and the table of figures. Some delight in logarithms or mental arithmetic, and some imperil their immortal souls because of blasphemy every time they attempt to



calculate a feeding. Many men of many minds, but to each the Graphic Feeding Chart presented in this number should come as a healing balm, a gentle zephyr, an ultimate answer—what you will. Do you use percentage modification, here it is at a glance. Do you check yourself by the fuel value of the food, here are your isotherms. Do you wish to convert one to the other, it is done instantaneously. No more pen and pencil and puckered brows as you figure and the family wait breathless; no more muttered curses or need of the confessional. The only man who will be disappointed is he whose mathematics is dearer than life and who, like Othello, finds his occupation gone.

We began with that statement of the Prince of Denmark, because this chart of Dr. Smith's takes on new aspects as it is the more closely and more thoroughly observed. At first it looks like the map of the Atlantic Ocean with the meridians of latitude and longitude and with steamship routes all converging somewhere around Cape Horn—and no land visible. A few minutes, however, suffice to show how invaluable it is to have all the mathematics of infant feeding done with the accuracy of the slide rule. From this point one goes on a voyage of discovery, finding new material and new applications all the time until the chart becomes an inseparable companion.

One thing the chart will not do—supply brains. If you do not know how to feed babies you will need something more than the chart to do so. It will not feed for you, although it will help you to learn how to feed accurately and make available to you your previous successes or failures.

We recommend that those who read about the chart do it with great deliberation and with constant reference to the chart in the text or another held in the hand.

### THE PHILADELPHIA MEETING.

Those who have not experienced the hospitality of the members of the Philadelphia Pediatric Society have still one of the rare things of life before them. The members of the New England, the New York and the New Jersey societies who journeyed to the City of Brotherly Love on the 12th day of November enjoyed a day of interesting visiting, a perfect dinner and a successful meeting. The report of that meeting and the papers of the evening will form the bulk of the December issue of *THE ARCHIVES*.

## ORIGINAL COMMUNICATIONS.

### THE ETIOLOGY OF CONVULSIONS IN EARLY LIFE.\*

BY FLOYD M. CRANDALL, M.D.,

New York.

A study of etiology is of prime importance to the understanding of all diseases. In some it is of more practical value than in others, because of the aid it offers in prevention and treatment. In few conditions is the determination of causation more important than in the convulsive disorders of children, because in a large proportion of cases the knowledge thus gained will lead to prevention. The prevention of convulsions in children is of much importance and is worthy of more thought than it frequently receives. The practitioner is prone to look upon these conditions too lightly and to feel that they are passing episodes which merit little anxiety. Death during a convulsion, while rare, is sufficiently frequent to demand every precaution; but of equal importance is the fact that if the cause is not determined and proper measures taken to prevent repetition, grave results may follow. Let the convulsions be repeated and a convulsive habit may be established which will wreck the future of the individual. Gowers reports 180 cases of epilepsy which began during the first three years of life. Among 460 cases of epilepsy carefully studied by Osler, 187 had their beginning in the first three years of life and 74 in the first year. Prophylaxis in the case of these convulsive disorders offers a fruitful field, but it must be based in each case upon a conscientious study of etiology.

The predisposing causes of convulsion in children are very potent. Among these the first is age. Infancy and early childhood are in themselves predisposing factors. It is not within the province of this paper to enter upon a study of pathology. It is sufficient to say that, in size, the brain of the newborn is out of all proportion to the body weight. The child is born with one-third the bulk of its adult brain, while its body weight is frequently not more than one-twentieth the adult weight. Almost the second third of the brain is acquired during the first year, and it has gained its full weight by the seventh year. Its functional capacity, however, is not attained until adult life. The voluntary centers of the cortex are scarcely developed. The child in

\* Read before the New York Academy of Medicine, Section on Pediatrics, October 7, 1912.

its second year with almost two-thirds of its adult brain substance, has not one-hundredth of its functional power. That power must be developed by years of education. The boy of eight years may be able to wear his father's hat, but he cannot conduct his father's business, because the functional power of his brain is not yet developed. Control by the higher centers is very slight at the outset. The very anatomy and physiology of the child, therefore, predisposes to uncontrolled nerve disorders and to explosions of nerve energy.

In view of these facts, it is not difficult to understand why convulsions are frequent during the first seven years and rare thereafter. This first seven years is a most important developmental period. The pathological conditions incident to this period are convulsions, night terrors, stammering, liability to sudden rises of temperature, and numerous other abnormalities resulting from enormous brain growth without adequate control by the higher nerve centers. Beginning with the termination of excessive brain growth at about seven years, we come to a period of active functional development, when muscular motion becomes co-ordinated with emotion. The diseases incident to this period are chorea, epilepsy, somnambulism, migraine, and certain eye defects.

The second predisposing cause of convulsions is heredity. While less tangible than the cause I have just mentioned, it is potent and very important. Every practitioner knows that the children in some families are particularly subject to convulsions and nervous manifestations and he learns to look for them in succeeding generations. He almost unconsciously acquires a knowledge which leads him to take certain measures in one family which he does not take under similar conditions in another. The laity often speak of this as "knowing their constitutions," and there is much truth in it. In some of these cases, the inherent tendency is so strong that prevention of an occasional convulsion is very difficult. The fate of the child was sealed before birth, and no professional skill can overcome these inherited defects. The physician looks upon some of these little unfortunates with a pity that is often close akin to hopelessness. Nevertheless, something can be done for all and some can be saved entirely from their hereditary tendencies.

The third predisposing cause of convulsions is rachitis. Tendency to convulsive disorders is sometimes a very early symptom



and appears before physical signs are well marked. In certain types of convulsive disorders, as tetany, rachitis is almost invariably present. In every case of convulsion, rachitis should be searched for and active measures taken for its relief.

The exciting causes of convulsions in children are legion, but they may be gathered into certain groups. It was once facetiously said that pediatrics of half a century ago was the science of worms, teething, and water-on-the-brain. The etiology of convulsions in ancient times certainly did not look much beyond these causes. And yet, there was a certain basis of truth, as is often the case in empirical medicine. Let us consider these three general causes. The first are the organic diseases—meningitis, hydrocephalus, hemorrhages, embolism, thrombosis, abscesses, tumors. These conditions may any of them be accompanied by convulsions at any stage. Meningitis, of course, presents this symptom more frequently than any of the others. The convulsions of newborn infants are frequently the result of cortical hemorrhage or birth injuries, but they may be due to septic infection.

The second class of exciting causes are the reflex. That reflex irritation is capable of causing convulsions in a predisposed baby cannot be doubted. For many years the most common explanation of a convulsion was teething. Neither the profession nor laity was troubled by any doubts upon the subject. Convulsions, it is true, are most frequent during the period of dentition, and teething was, therefore, given as the most common cause. The pendulum began to swing, however, and swung too far in the other direction, and some have held that dentition is never a cause of disturbance in a child. Most practitioners at present, I think, are inclined to take less extreme ground; that, at least, is my position. I am positive that children are not infrequently disturbed when they are cutting their teeth. But I feel equally positive that dentition alone very rarely causes convulsions. I will accept that conclusion only after thorough search for other causes. What I have said of dentition may be repeated of phimosis. The effect of reflex irritation of undigested food masses in the alimentary canal is uncertain. I cannot help thinking that irritating masses of food may of themselves induce convulsions through the agency of reflex action. More commonly, however, the symptoms are due to toxemia. The indication for treatment is clear. First, get rid of the undigested food, and



then it may be determined whether it was producing its evil effects through the influence of reflex action or toxemia.

The power of worms in the intestine to cause convulsions is another question which might open up discussion. With the evidence or suspicion that worms are present, the indication is clear. Get rid of them at once, and then perhaps evolve a theory as to what they have done, and how they have accomplished it.

The third group of exciting causes is the toxic. Of these uremia may be considered first. In children nephritis is usually the sequel of some infectious disease, more commonly scarlet fever. Any of the other infectious diseases, however, may be followed by this condition. Much has been said during recent years of the frequency of nephritis during the course of intestinal infections. It is not usually, however, sufficiently severe to cause convulsions. In certain epidemics, grippe particularly when complicated by intestinal infection, it is not unusual to find marked nephritis, but convulsions do not occur except in very susceptible young children.

The acute infectious diseases may be accompanied by convulsions. They more commonly occur at the outset and seem to take the place of the chill in the adult. This is particularly true of pneumonia. In malarial fever with distinctive paroxysms, a convulsion may take the place of the chill in a young child and may be repeated as often as the paroxysm is repeated. A convulsion occurring late in the infectious fevers is usually of more serious import than when it occurs at the outset. Of the contagious diseases, pertussis is the one most commonly complicated by convulsions. The cerebral congestion induced by violent paroxysms is a potent cause and in a susceptible child may easily provoke a convulsive seizure. In these infectious diseases the convulsion is apparently due to the specific poison which produces the disease.

Of all exciting causes of convulsions the one most frequently present is undigested food in the alimentary canal. The convulsion is more often due to toxemia than to reflex action. It is a true intoxication, by which we mean in these days an absorption of poisonous ptomains from putrefying matter. The bacteria may not enter the blood. The ptomains which they generate are absorbed and act as true poisons. The proteid elements of food are especial offenders and the poisons which they generate are particularly virulent. While there may be an element of re-

flex action and while occasionally it is the only factor, still in the great majority of cases we must be convinced that toxemia is present and is the most potent factor. The child is actually suffering from an intoxication.

In the conditions allied to the simple convulsions of children, notably in tetany and laryngismus stridulus, the same predisposing etiological factors are found. In these two disorders, however, rachitis has been believed to be of especial importance. Some have held that it is the only positive factor, but such ground is not tenable. While tetany and laryngismus stridulus are rarely, if ever, found in non-rachitic children, some other factor must certainly be present. These conditions are rare and rachitis is very common. The factor of inherited unstable nervous temperament is certainly important. In my last case of laryngismus stridulus, the mother was a frail, neurotic woman who suffered from mania both before and after the birth of the child. Laryngismus stridulus developed before the baby was six months old. Craniotabes was present, but there was no other distinctive sign of rachitis. In many cases the neurotic inheritance is very marked.

Strong evidence has recently been adduced that we are on the track of the other factor to which I have referred. The rôle played by the inorganic salts, particularly calcium, is apparently a potent one. It would be carrying coals to Newcastle for me to enter upon the discussion of this question, in view of the fact that Dr. Grulee is to follow me with a paper upon the subject upon which he has done such admirable original work.

Study of etiology in these cases shows clearly that the practitioner is not doing his full duty when he is content simply to bring the child through the seizure. Every such case demands careful investigation. Not only the immediate causative factor should be determined, but the underlying causes as well. The practitioner is remiss who neglects to use every precaution to prevent further seizures and this involves a careful study of etiology. In some cases the underlying predisposing causes are so potent as to render the child subject to a convulsion upon the most trivial exciting cause. In other cases, only the onset of acute illness or grave digestive disorders will precipitate an attack. In any case, the attending physician should not forget the dictum that careful investigation will enable him to do something for every patient and everything for some patients.

## PROBLEMS OF INFANT FEEDING ILLUSTRATED BY CASES AND CHARTS.

BY PERCIVAL J. EATON, M.D.,

Pittsburg, Pa.

In presenting this series of cases we have in mind the bringing to your attention certain facts, and perhaps some indications of their relations to certain theories which we consider fundamental in the artificial feeding of infants.

Certified milk was used in all cases where possible and gravity cream (averaging 16 per cent. butter fat). No mixtures were ever sterilized or pasteurized. All schedules and directions were written out, even to hours of feeding, and stress laid upon the carrying out of all orders at the expressed and proper time. These cases could be multiplied many times, but we have selected those which were most available, and have given you some cases of rather slow gain, and some of rather extraordinary gain, the average lying somewhere between the two.

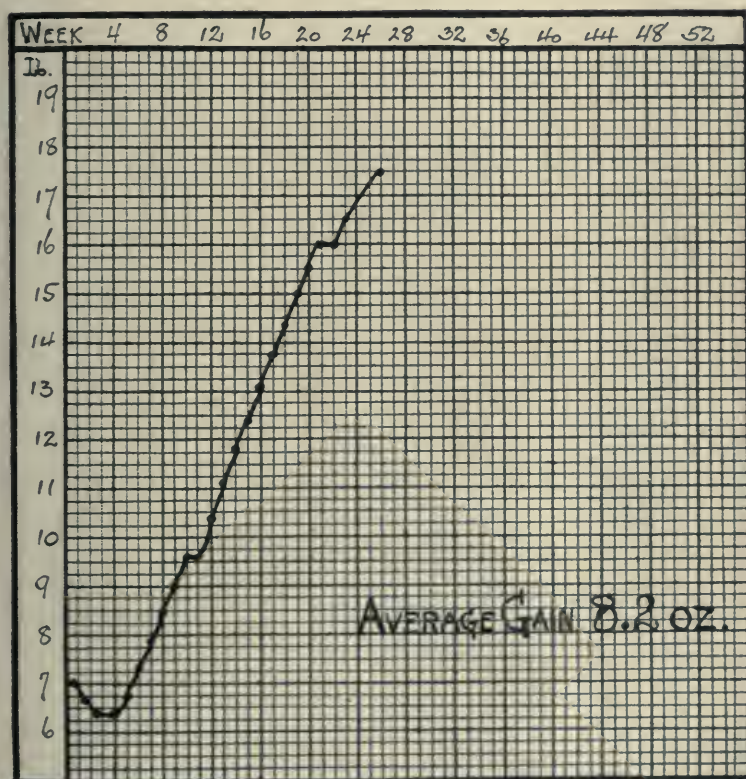
CASE No. 1. Was brought to us during its fourth week, then weighing  $6\frac{1}{2}$  pounds. It had been irregularly fed by a very nervous mother, was hungry and had much colic. The child was put on a schedule of feeding hours and attempts were made to improve the breast milk. The baby was restless and hungry notwithstanding, so that during its fifth week it was given whey enough to assuage its hunger, and it gained a little. During its seventh week the breast milk decreased so rapidly in amount that the child was put upon a formula. The baby began to gain well, and soon, from the utter failure of the breast milk, was on



modified milk. It has gained consistently, except during its eleventh and twenty-sixth week. During the eleventh week the mother was ill and a nurse cared for the baby, but was not regular and the baby fussed a great deal. During the twenty-sixth week the baby had a bad catarrhal cold. The formula was changed whenever the baby was not satisfied. It is well, flesh hard, color good, and it is very active.

## No. 1.

Formula . . . .	1	2	3	4	5	6	7
Fat % . . . . .	2.0	2.0	2.42	2.66	2.66	2.66	2.66
Proteid % ..	1.31	1.31	1.59	1.75	1.75	1.83	2.08
Amount in oz.	24	32	33	42	48	42	42

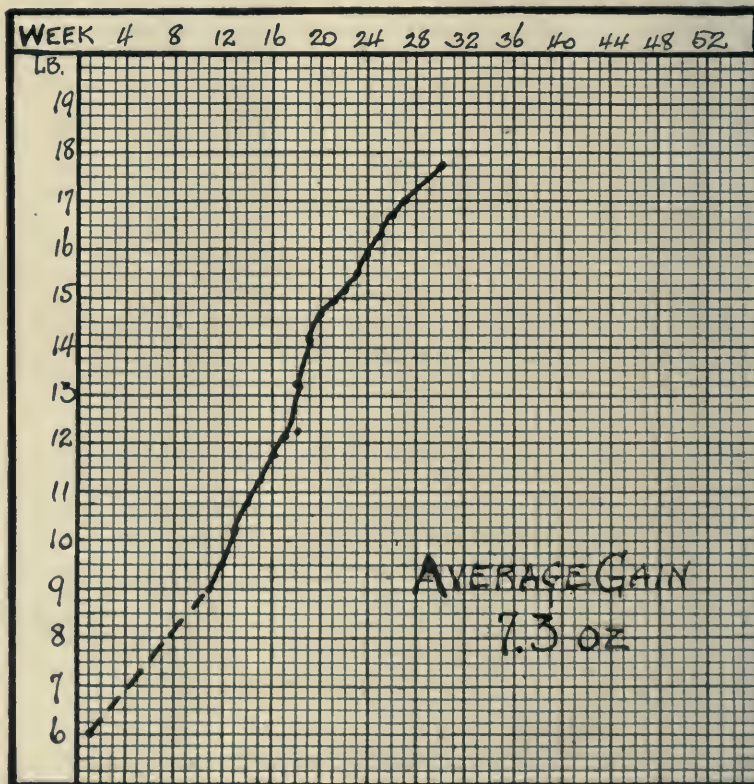




CASE NO. 2. Was seen first when eleven weeks old. Had not gained much for five weeks and was very restless, hungry and colicky. Attempts were made to increase the quantity and quality of the breast milk, but during its twelfth week, in addition to both breasts, was given an ounce or two of whey at each feeding. The child began to gain, but the breast supply steadily diminished and modified milk has since been its food. Has gained consistently, is firm of flesh, has a fine color, is contented and happy.

## No. 2.

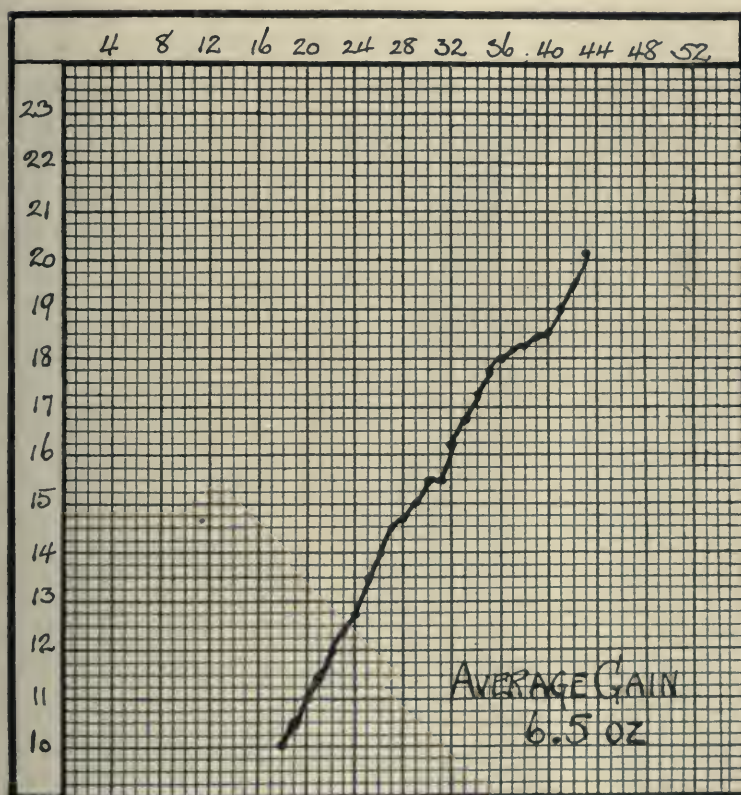
Formula . . . .	1	2	3	4	5	6	7	8	9
Fat % . . . . .	2.3	2.3	2.4	2.3	2.51	2.37	2.37	2.56	2.56
Proteid % ..	1.37	1.50	1.57	1.71	1.65	1.69	1.81	1.87	2.1
Amount in oz.	28	35	40	49	51	54	54	56	56



CASE No. 3. M. E. B., born July 20, 1911, initial weight  $7\frac{1}{2}$  pounds, was brought to us during her eighteenth week; then weighed just 10 pounds, was very pale and hungry. Mother had had some mastitis and was giving baby right breast only and a formula. Baby was constipated. The chart indicates the strength and the amount and also the gain. The last two or three weeks has not gained so much, but has been attempting to erupt teeth, and is not quite so happy.

No. 3.

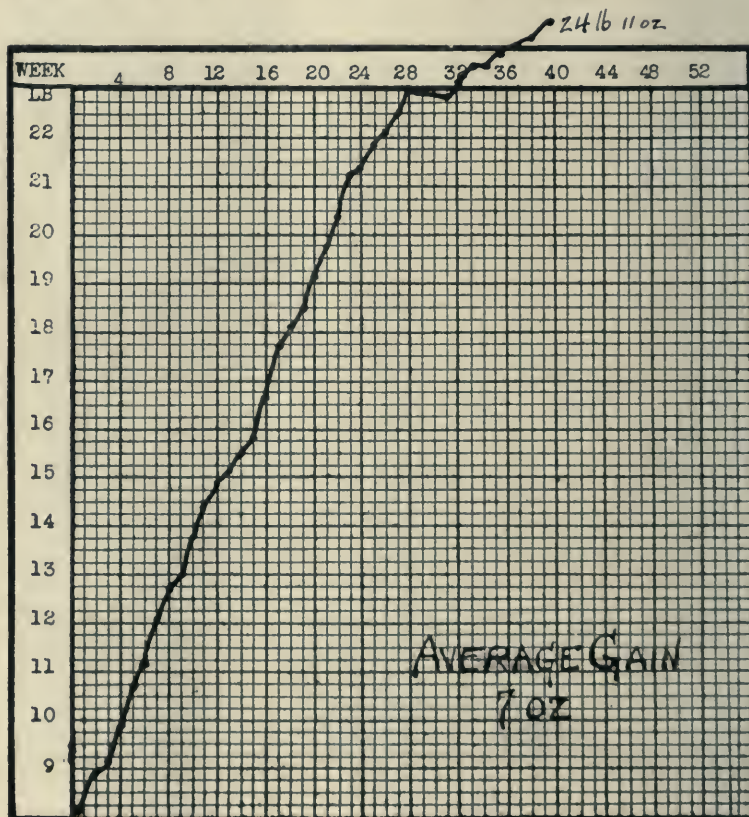
Formula . . . .	1	2	3	4	5
Fat % . . . . .	2.66	2.66	2.66	2.66	2.66
Proteid % ..	1.40	1.55	1.75	1.83	2.—
Amount in oz.	30	36	42	42	48



CASE No. 4. W. McC. M. At birth weighed 8 pounds, 14½ ounces. Mother nursed it for a little more than three weeks, but during that time it had to have whey to satisfy it. About that time the mother had an attack of ptomain poisoning from fish, and the milk disappeared. The baby was put upon a formula, and has been on various modifications of milk ever since. Is overweight, hard, and has gained well. Has never been ill, except during its thirtieth week, when it had a very bad infectious catarrhal cold accompanied by some temperature, loss of appetite and a good deal of cough. Now has cereal jelly added to formula and takes four feedings of 13 ounces each.

No. 4.

Formula . . . .	1	2	3	4	5	6	7	8	9
Fat % . . . . .	1.60	2.3	1.8	1.7	2.4			3.3	
Proteid % ..	1.40	1.60	1.60	1.60	1.6—			3.—	
Amount in oz.	20	35	48	57	62	52		52	

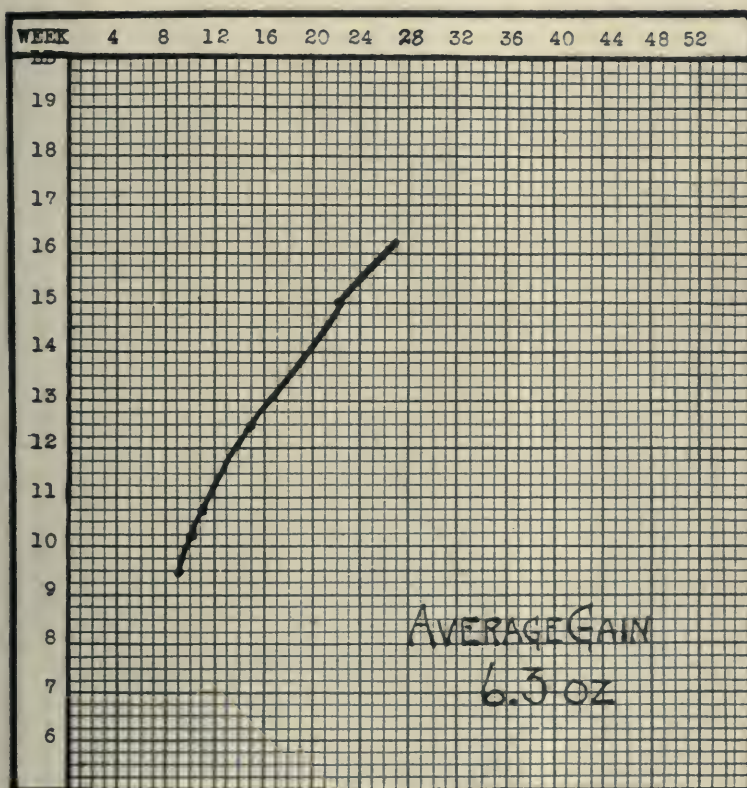




CASE No. 5. R. N. Weighed 6 pounds, 12 ounces at birth. Was brought to us when eight weeks old with the statement that the breast milk did not agree with it, and that it had been on malted milk. Mother thinks has possibly gained, but probably not. Put upon a modified milk formula during its ninth week. Has gained, has been uninterruptedly good, and has been perfectly well during the whole time.

No. 5.

Formula ....	1	2	3	4	5	6
Fat % .....	2.—	2.0	2.4	2.66	2.56	2.56
Proteid % ..	1.42	1.64	1.75	1.75	1.82	1.96
Amount in oz.	32	32	40	42	50	50

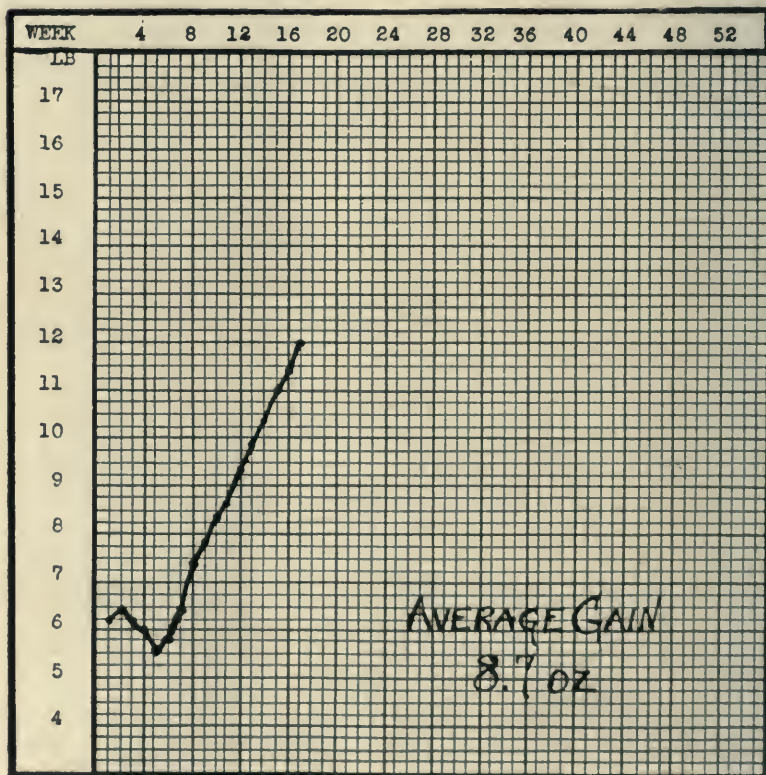




CASE No. 6. J. E. G. Was brought to us when six weeks old. Was breast fed for a week or two, then put upon condensed milk for a short time, and of late has been on an extremely indefinite modification of indefinite milk. Having been put upon a proper formula, immediately began to gain, and this gain has been continuous. You will note that the fifth and sixth formulas had below 2 per cent. of butter fat, as the child seemed to have too frequent bowel movements. Baby's general condition most excellent, flesh hardening well, skin very attractively wholesome.

## No. 6.

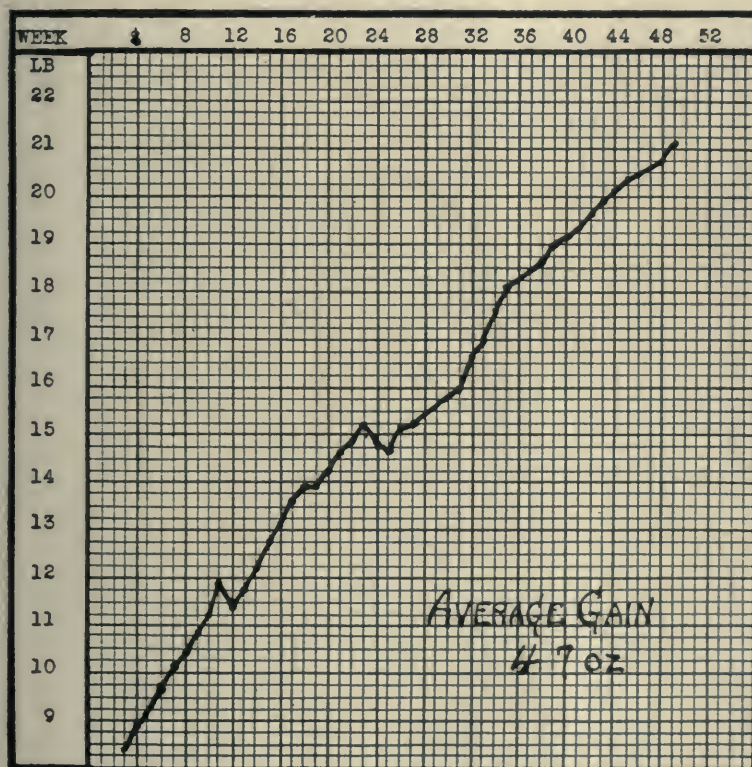
Formula ....	1	2	3	4	5	6	7	8
Fat % .....	2.	2.+	2.+	2.3	1.9	1.8	2.	2.3
Proteid % ..	1.31	1.35	1.35	1.50	1.58	1.55	1.75	1.87
Amount in oz.	24	31	39	42	42	54	56	56



CASE NO. 7. M. M. S. Breast-milk supply lasted a very short time, and within a couple of weeks after birth was put upon modified milk. Gained rather steadily, although not quite so evenly as some children. Any excess in fat seemed to cause child to spit up a good deal. Every time child was about to erupt teeth had some catarrhal disturbance of mucous membranes, and did not gain quite as rapidly as usual. At present is well up to weight, exceedingly strong and well and very vigorous.

## No. 7.

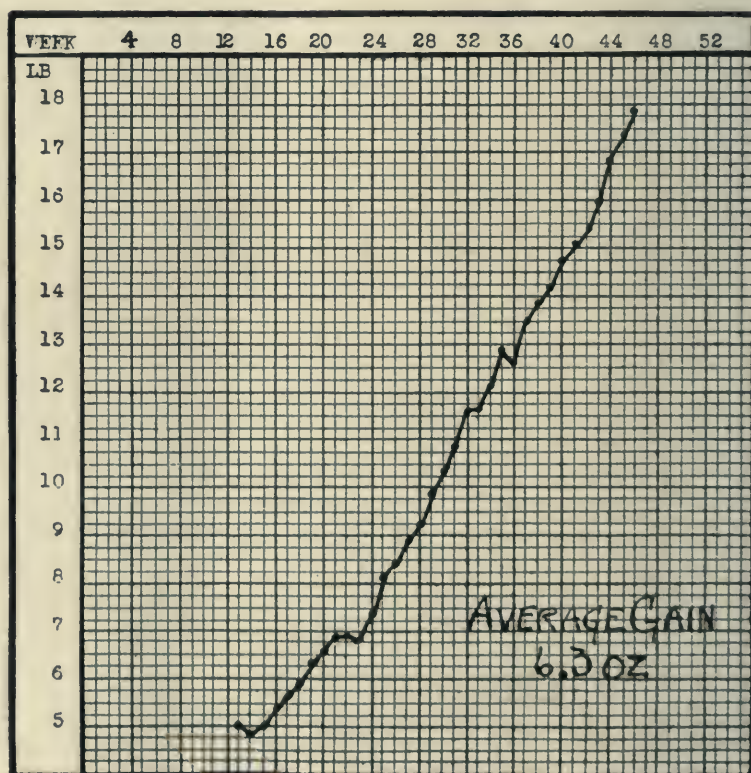
Formula . . . .	1	2	3	4	5	6	7	8	9
Fat % . . . . .	2.3	2.	2.4	2.7	2.66	3.2	3.5	3.0	
Proteid % ..	1.25	1.40	1.75	1.75	2.10	2.21	2.93	3.1	
Amount in oz.	28	40	46	50	60	60	49	44	



CASE NO. 8. This child was brought to us when three months old. Although breast-fed was losing weight rapidly. Had not been fed at all regularly. Whey was given in addition to the breast feeding for a while, but soon, because of the failure of the breast milk, the baby was put upon a formula. Began to gain fairly well, and with a few interruptions, which were due to an occasional cold, and once to the parents giving a formula of their own to the child, has gained with increased rapidity. Instead of milk sugar the child has had malted milk since having formula, as it had been given malted milk in addition to the

No. 8.

Formula . . . .	1	2	3	4	5	6
Fat % . . . . .	0.9	1.27	2.—	2.+	2.56	2.56
Proteid % ..	1.16	1.38	1.75	1.75	1.96	2.24
Amount in oz.	36	38	42	48	50	50





breast in its early days. It has now a good color, is strong, very active, and is rapidly approaching the normal line of gain. This case has been particularly interesting because of the very feeble condition the child was in, and because of the strenuous methods necessary to have the child treated with machine-like regularity. The initial appearance of the child was shocking in the extreme, its emaciation was great and its color was very poor. In fact, its condition was such as to preclude the probability of a favorable prognosis. It was a case of try and try hard.

In the days of my house service at the Children's Hospital of Boston, we used to write formulas of fat 3:50 to 4:50; proteid 1 to 1:25 or 1:31 per cent., and give that to ordinary, average, very young babies, and "get away with it," too. Fats in almost any amounts were then considered easy of digestion, and our bugbear was called "proteid" or "curd." In those days we had unmentionable milk, and for safety's sake we must needs sterilize every drop. We all, I think, believe that cooking milk alters the physical condition of the proteid content, rendering it less easy of digestion, and therein, I believe, lay our old-time difficulty with the administration of really sufficient proteid to insure the proper balance of growth.

As Rotch, of Boston, and Coit, of Newark, worked for better milk—cleaner milk—for milk that would not need sterilization to make and keep it useful; by so much as success crowned their efforts did we find that we could get along with pasteurized milk, and that, because of the lesser heat used, the proteids were better digested and more easily assimilated. When, later, certified milk or Walker-Gordon milk could be obtained, and the use of raw milk could be safely entered upon, we found that much higher percentages of proteid could be used profitably, and this series of cases gives, we think, a proof not only of this, but also a hint as to the cause of some of our old-time troubles among artificially-fed infants.

Babies grew fat and gained weight, but their progress was not, as a rule, of uninterrupted *good health*. Every now and again we were called to see a baby who was constipated, vomiting, full of gas, feverish; one whose bowels were very hard to clean out; one who, when the bowels were once started, had a number of indescribably filthy stools. Often these stools were black in



color from the changes in the fats due to long retention in the bowel, and it is not surprising that the toxins so generated caused a rather stubborn and rather long-continued reaction.

Not one of the babies whose charts we show here has had any such attack, nor has any child in our practice who has been fed in this manner, *i.e.*, low fats and comparatively high proteids. We dwell upon this point, because it has seemed to have given us such uniformly good results, yet we do not in any way mean to intimate that there are not individual children who will do better upon higher percentages of fat and lower percentages of proteid. Each child should be considered, not as one of a class or group, but as a unit, and its food should be so designed (if we can so use the word) as to supply to the fullest extent *its individual needs*. Perhaps the charts have made plain the fact that each child has been allowed all the food *it could take and take care of*. No child under our care has ever been limited in the amount of its food by any preconceived notion, based on any set of tables, of just how much a baby of its age or weight should hold. The "Progressive-Series-Feeding-Tables" idea, analogous to the composite photograph idea, should not be entertained by the real pediatrician. Babies are units, influenced by heredity and environment, and our most important task is to find out just what, and just how much, is most suitable for the given child. We are not necessarily striving to raise fat babies, but those that will be, and will remain, thoroughly well; who will have a consistent, normal growth and the greatest resistance.

*To recapitulate:—*

*First.*—A large number of babies thrive well on low fats and comparatively high proteids.

*Second.*—Their digestion and assimilation seems to be more than usually efficient.

*Third.*—Their freedom from gastrointestinal disturbances is remarkable.

*Fourth.*—Their growth quite uniformly satisfactory.

*Fifth.*—Children should have in quantity all the food they can take and take care of.

*Sixth.*—Each child should be considered as a unit, and should be treated as such.

*Seventh.*—The best obtainable milk, most carefully handled, is none too good for the little people.

## A SHORT METHOD OF CALCULATING PERCENTAGE MODIFICATIONS.

BY MAYNARD LADD, M.D.,

Instructor in Pediatrics, Harvard Medical School.

The difficulty of teaching a system for the percentage calculation of milk modifications that is simple and quick in its application and at the same time illustrative of the underlying principles, has been felt by many instructors in pediatrics.

The method here explained is in substance based on well known principles. Its originality consists only in a few short cuts which simplify the calculation without confusing the mind of the student as to the principles involved.

It is important for the student to realize that there is no essential difference between "cream" and "top milk" mixtures, or between a modification obtained by diluting whole milk and one of the same percentage composition obtained by use of a cream and fat free milk. If the calculation is accurate, the end result is the same in both instances, but the explanation of the principle of the calculation is greatly simplified when a cream of definite fat percentage and fat free milk are used, for the reason that no allowance need be made for the fat contained in the whole milk. The method is also more economical, as the one quart of milk furnishes the materials required.

If one works with a cream of definite fat percentage, such as a 16 per cent. cream, each ounce of the cream in a 20 ounce mixture, for example, will give a certain percentage of fat in the mixture and also a certain percentage of protein. If an additional percentage of protein is required, it is obtained by the addition of fat free milk. The cream and the fat free milk have also contributed a certain percentage of sugar in the mixture. If additional sugar is needed, it is obtained by adding dry sugar.

In short, in calculating a milk modification, we estimate first the number of ounces of cream to be used to get the fat percentage required by the modification. We then estimate the amount of protein this cream has given, and if the modification calls for more, we add fat free milk in sufficient amount to make up the deficiency. We then calculate the amount of sugar which

has been contributed by the cream and fat free milk, and if more is required in the modification we add milk sugar, or some other variety, such as maltose, to make up the deficiency. The remainder of the mixture is the diluent.

Let us assume, then, as our basis of calculation, that 16 per cent. cream contains 16 per cent. fat and 3.05 per cent. protein (Rotch), and that fat-free milk contains no fat and 3.60 protein (Rotch).

One ounce of 16 per cent. cream in a 20-ounce mixture gives, therefore,  $\frac{16}{20}$  fat, or 0.80 per cent., and  $\frac{3.05}{20}$ , or .15 per cent. protein, while 1 ounce of fat-free milk in a 20-ounce mixture gives  $\frac{3.6}{20}$  proteins, or 0.18 per cent., which for all practical purposes may be called 0.20 per cent.

Now to estimate the sugar percentage from the cream and again from the fat-free milk requires considerable figuring. The short cut I have employed consists in assuming that the percentage of sugar in a mixture is one-fourth the number of ounces of 16 per cent. cream and fat-free milk used. This assumption involves a slight but negligible error, but, as will be seen, greatly simplifies the calculation.

With these facts clearly in view the method of calculation is readily understood and can, with a little practice, be calculated mentally or, at least, with the minimum amount of figuring.

#### PLAIN CREAM MIXTURES.

In a 20-ounce plain cream mixture,

One ounce 16 per cent. cream = 0.80 per cent. fat and 0.15 per cent. protein.

One ounce fat-free milk = 0.20 per cent. protein.

One-fourth of the number of  
ounces of cream and milk  
used = percentage of sugar in the mixture from the cream and milk.

One measure (level table-  
spoon) of sugar = 2.00 per cent. sugar.

1. To calculate the fat percentage in a 20-ounce mixture:  
Divide the percentage of fat desired by 0.80. This will give the number of ounces of 16 per cent. cream.

2. To calculate the protein percentage in a 20-ounce mixture: Multiply the number of ounces of 16 per cent. cream, as obtained in (1) by 0.15, subtract the result from the percentage of protein desired, and divide by 0.20. This will give the number of ounces of fat-free milk.
3. To calculate the *sugar* percentage in a 20-ounce mixture: Divide the sum of the ounces of cream and milk by 4, subtract the result from the percentage of sugar desired, and divide by 2. This will give the number of measures or level tablespoonful of sugar to be added.
4. To calculate the diluent: Subtract the sum of the cream and milk from the total number of ounces of the mixture.

## EXAMPLE I.

R	Fat .....	4.00
	Sugar .....	7.00
	Protein .....	1.50
	Amount .....	20 ounces

The result will be—

Fats.....	$\frac{4}{0.80}$	or 5 ounces, 16 per cent. cream.
Proteins .....	$\frac{1.50 - (5 \times 0.15)}{0.20}$	or $3\frac{3}{4}$ ounces, fat-free milk
Sugar .....	$\frac{7.00 - \frac{1}{4}(5 + 3\frac{3}{4})}{2.00}$	or 2.4 measures of sugar
Diluent .....	$20 - (5 + 3\frac{3}{4})$	or $11\frac{1}{4}$ ounces

For a 30 ounce mixture multiply each ingredient by  $1\frac{1}{2}$

"	"	40	"	"	"	"	"	2
"	"	50	"	"	"	"	"	$2\frac{1}{2}$

## EXAMPLE II.

R	Fat .....	1.60
	Sugar .....	5.00
	Protein .....	3.00
	Amount .....	20 ounces



The result will be—

	1.60	
Fats.....	<u>          </u>	or 2 ounces, 16 per cent. cream
	0.80	
	3.00 — (2 × 0.15)	
Proteins .....	<u>          </u>	or 13.5 ounces, fat-free milk
	0.20	
	5.00 — $\frac{1}{4}$ (2 + 13.5)	
Sugar .....	<u>          </u>	or 0.5 measures
	2.00	
Diluent .....	20 — (2 + 13.5)	or 4.5 ounces

### EXAMPLE III.

R Fat .....	0.00
Sugar .....	7.00
Protein .....	1.50
Amount .....	20 ounces

The result will be—

Fats.....	0	
	1.50	
Proteins .....	<u>          </u>	or 7.5 ounces
	0.20	
	7.00 — $\frac{1}{4}$ (7.5)	
Sugar .....	<u>          </u>	or 2.5 measures
	2.00	
Diluent .....	20 — 7.5	or 12.5 ounces

### WHEY MIXTURES.

The calculation of whey mixtures can be similarly simplified. Three-fourths ( $\frac{3}{4}$ ) of the protein in cream or milk is casein and one-fourth ( $\frac{1}{4}$ ) is whey protein; the percentage of whey protein from a given amount of cream and milk is, therefore, always one-third ( $\frac{1}{3}$ ) of the casein percentage of the mixture. Furthermore, as whey contains approximately 1 per cent. whey protein, 1 ounce of whey in a 20-ounce mixture gives  $\frac{1}{20}$  of 1, or 0.05 per cent. whey protein.

In a 20-ounce whey cream mixture, therefore,

1 ounce 16 per cent. cream = 0.12 per cent. casein (*i.e.*,  $\frac{3}{4}$  of the total protein percentage).

1 ounce fat-free milk = 0.15 per cent. casein (*i.e.*,  $\frac{3}{4}$  of the total protein percentage).

1 ounce whey = 0.05 per cent. whey protein.

One-third ( $\frac{1}{3}$ ) of the casein percentage in a whey mixture = the percentage of whey contributed by the cream and milk.

- A. To calculate the fat percentage in a whey cream mixture (20 ounces) proceed as in (1) in the cream mixtures.
- B. To calculate the casein percentage (in a 20-ounce mixture) multiply the number of ounces of 16 per cent. cream by 0.12, subtract the result from the percentage of protein desired and divide by 0.15. This will give the number of ounces of fat-free milk.
- C. To calculate the whey protein: Subtract  $\frac{1}{3}$  of the *casein percentage* in the formula from the percentage of whey protein required and divide by 0.05. This will give the number of ounces of whey required.
- D. To calculate the sugar percentage: Subtract  $\frac{1}{4}$  of the sum of the cream, milk and whey, from the percentage of sugar desired and divide by 2. This will give the number of measures or level tablespoonfuls of sugar required.
- E. To calculate the diluent: Subtract the sum of the cream, milk and whey from the total number of ounces of the diluent.

#### EXAMPLE I.

R	Fat .....	2.00
	Sugar .....	6.00
	Whey protein .....	0.90
	Casein .....	0.60
	Amount .....	20 ounces

The result will be—

$$\begin{array}{r} \text{Fats.....} \quad \frac{2}{0.80} \quad \text{or 2.5 ounces} \end{array}$$

Casein.....	$\frac{0.60 - (2.5 \times 0.12)}{0.15}$	or 2 ounces
Whey .....	$\frac{0.90 - \frac{1}{3} (0.60)}{0.05}$	or 14 ounces
Sugar .....	$\frac{6.00 - \frac{1}{4} (2.5 + 2 + 14)}{2.0}$	or 0.7 measure
Diluent .....	$20 - (2.5 + 2 + 14)$	or 1.5 ounces

## EXAMPLE II.

R Fats .....	4.00
Sugar .....	7.00
Whey protein .....	0.75
Casein .....	1.00
Amount .....	20 ounces

The result will be—

Fats.....	$\frac{4}{0.80}$	or 5 ounces
Casein.....	$\frac{1.00 - (5 \times 0.12)}{0.15}$	or 2.75 ounces
Whey protein...	$\frac{0.75 - \frac{1}{3} (1.00)}{0.05}$	or 8 ounces
Sugar .....	$\frac{7 - \frac{1}{4} (5 + 2.75 + 8)}{2.0}$	or 1.5 measures
Diluent .....	$20 - (5 + 2.75 + 8)$	or 5.25 ounces

## TO CALCULATE PERCENTAGES OF STARCH.

If one makes use of a stock solution of starch, such as barley, containing 3 per cent. of barley starch, 1 ounce of the stock solution in a 20-ounce mixture will give

$$\frac{3}{20} \text{ or } 0.15 \text{ per cent. starch}$$

To get any desired percentage of starch in a modification, divide the percentage required by 0.15; the result is the number of ounces required of the 3 per cent. solution.

*Example:* To get 0.75 barley starch in a 20-ounce mixture:

$$\frac{0.75}{0.15} \text{ or } 5 \text{ ounces of the 3 per cent. solution}$$

NOTE: A 3 per cent. barley solution may be made by taking 2 ounces of the barley flour (Robinson's) to 1 quart of boiling water, cooking in a double boiler for thirty minutes, adding enough water to make up for evaporation.

#### THE USE OF CREAMS OR TOP MILK OF DIFFERENT FAT PERCENTAGES.

It may be the practice or choice of a physician to use a cream or top milk containing 10 per cent. fat, 12 per cent. fat or 20 per cent. fat. The rules given above may be applied with equal facility, simply by varying the calculation of the fat percentage in the mixture.

When 10% cream is used—1 ounce = 0.5 fat in 20-ounce mixture

"	12	"	"	"	"	"	"	"	0.6	"	"	"	"	"
"	20	"	"	"	"	"	"	"	1.0	"	"	"	"	"

The fat percentage desired is therefore divided by 0.5, 0.6 or 1.0 according to the cream used, instead of by 0.8, as in the case of 16 per cent. cream.

It is obvious that "top milk" is a relative term, as is "cream," and can be used only with reference to the percentage of fat contained in the amount which is removed.

The relation between creams of different fat percentages to top milk may be made clear by the following table:—

A quart of 4 per cent. milk, allowed to stand for eight hours in a refrigerator, will yield approximately:—



20	per	cent.	cream	in	the	top	4	ounces	.
16	"	"	"	"	"	"	6	"	
12	"	"	"	"	"	"	8	"	
10	"	"	"	"	"	"	11	"	

If the milk is of 3 per cent. fat:—

20	per	cent.	cream	in	the	top	2	ounces
16	"	"	"	"	"	"	4	"
12	"	"	"	"	"	"	6	"
10	"	"	"	"	"	"	9	"

If the milk is 5 per cent. fat:—

20	per	cent.	cream	in	the	top	6	ounces
16	"	"	"	"	"	"	8	"
12	"	"	"	"	"	"	10	"
10	"	"	"	"	"	"	13	"

If the composition of the milk used is not known, the safest assumption on which to work is that the milk contains 4 per cent. fat.

There is no advantage in working with cream and whole milk. To do so requires one to buy 1 quart for the whole milk and from 1 to 2 quarts in addition for the removal of the cream. This is an item to be considered when some certified milk sells at 20 cents a quart. By working with cream and fat-free milk one obtains the materials for the modification from the same quart, often at a saving of one or more dollars per week in the cost of the food.

When the lowest 8 ounces of a quart of milk which has stood for eight hours is used as "fat-free milk" and when whey is made from the milk which is left after removing the cream, instead of from whole milk, the percentage of fat in the whey and "fat-free" milk is so small that it can be disregarded in calculating modifications.

Whether one follows one school of feeding or another, the necessity of accuracy in prescription is fundamental and only by expressing the value of a food formula in percentages of its ingredients can one intelligently check one's results in the feeding of infants, and judge wisely as to their food requirements.

## A GRAPHIC FEEDING CHART:

### A METHOD FOR CALCULATING MILK PERCENTAGES AND CALORIC VALUES.\*

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#### I.

The possibility of plotting a graphic chart for the sake of saving time in writing milk formulæ was suggested to the writer by an electrical engineer. It seemed at first thought as if there were too many variants involved, but it proved to be comparatively simple, and after several months of experiment the chart has reached its present form. It has saved the writer much time already, and has been received with enough interest by others who are familiar with the subject to make it seem worth while to bring it to more general attention.

The chart† is not a method for modifying milk, nor for feeding infants, but merely a labor-saving device for avoiding arithmetical calculations. It presupposes a knowledge of the principles of infant feeding, and of the requirements of the normal and abnormal child in terms of calories, and of the percentages of the milk constituents. Given that knowledge, the chart enables one to write formulæ rapidly and easily, even in the presence of the talkative mother and the crying child.

The basis of the chart is the 20-ounce mixture. The vertical lines divide it into twenty parts, each representing 1 ounce. These lines are numbered at the bottom and are called *ounce lines*.

The horizontal lines divide the chart into forty parts, each representing  $\frac{1}{10}$  per cent., or 4 per cent. in all. These lines are numbered at the left and are called *per cent. lines*.

The continuous lines radiating from the lower left-hand corner are the *milk lines*. Each represents a different top, whole or bottom milk. The percentage of fat and the ounces of top milk which must be removed to obtain each are shown by the two

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† The chart itself occupies pages 849 and 850.

rows of figures at the top of the chart. The bottom milks are shown by the figures at the right of the chart with the number of ounces which must be skimmed from the bottle to leave each bottom milk.

This is on the basis of a 4 per cent. milk. When whole milk is 5 per cent., the 5 per cent. line is used for whole milk, and ounces to be taken off are read on the milk line to the right of one being used.

Using a 5 per cent. milk—

*i. e.* To get 6 per cent. milk take top 24 ounces

"	"	7	"	"	"	"	"	20	"	
"	"	4	"	"	"	skim off	2	"		
"	"	3	"	"	"	"	"	3	"	} (Note exception to above rule)
"	"	2	"	"	"	"	"	5	"	
"	"	1	"	"	"	"	"	8	"	

The sugar and proteid vary but little, if any, in different top milks, etc., and may be assumed to be constant. Hence one line will do for each of these. The upper broken line represents *sugar*, and the lower *proteid*, considering the sugar to be 4.5 per cent. and the proteid 3.5 per cent. in top, whole or bottom milk.

The *milk lines* and the *sugar* and *proteid lines* constitute what may be called the percentage part of the chart. They merely show graphically what must obtain if the different milks are diluted with different amounts of any diluent up to 20 ounces.

*e.g.* 4% milk, take 10 oz. in 20. Fat = 2 %, Sugar = 2.25%, Proteid = 1.75%  
 7% milk, take 8 oz. in 20. Fat = 2.8 %, Sugar = 1.8 %, Proteid = 1.4 %  
 3% milk, take 15 oz. in 20. Fat = 2.25%, Sugar = 3.4 %, Proteid = 2.6 %

The chart may be used in several different ways.

#### I. TO OBTAIN ANY DESIRED COMBINATION OF FAT AND PROTEID.

(a) Follow the *proteid line* to the intersection with the desired *per cent. line*. The vertical line (*ounce line*) through this point gives the *number of ounces of milk* which must be used in 20 ounces.

(b) Follow this vertical line to the desired fat per cent. The *milk line* through this point gives the *kind of milk* which must be used.

(c) Follow the same vertical line to the *sugar line*, and read the per cent. of sugar in the *milk*. Opposite this point in the left-

hand margin read in column under "C. H." the number of *level* tablespoonfuls of carbohydrate needed to bring the carbohydrate per cent. to 6 per cent. (large figures). The upper figures show carbohydrate per cent. to be added, the lower show the number of calories in this amount.

(N. B.—All tablespoonfuls are level throughout this paper.)

*e.g.* To write a formula of fat, 3 per cent.; sugar, 6 per cent.; proteid, 1.75 per cent.:—

(a) Follow *proteid line* to 1.75 *per cent. line*. This gives *number of ounces of milk* which must be used, *i.e.*, 10 ounces.

(b) Follow the 10-ounce *line* to desired fat per cent., *i.e.*, 3 per cent. The 6 per cent. *milk line* intersects this point. This gives kind of milk, *i.e.*, 6 per cent., or top 20 ounces from bottle.

(c) Follow 10-ounce *line* to *sugar line*. Read sugar per cent. in milk, *i.e.*, 2.25 per cent.

Opposite this point in the left-hand margin read amount of carbohydrate which must be added to bring carbohydrate percentage to 6 per cent., *i.e.*,  $2\frac{1}{4}$  tablespoonfuls, or 3.7 per cent. of carbohydrate.

Hence we write at once the following:—

Milk, top 20 ounces, take of this	10 ounces
Lactose .....	$2\frac{1}{4}$ tablespoonfuls
Water .....	10 ounces
	<hr/>
	20 ounces

If we desire a larger quantity, it is necessary to multiply the above figures by  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$  or 3 to get 30, 40, 50, 60 ounces.

The second way in which the chart may be used is the converse of the above.

## II. TO DETERMINE THE STRENGTH OF ANY MIXTURE.

<i>e.g.</i> Milk, top 24 ounces, take	12 ounces
Lactose .....	2 tablespoonfuls
Water .....	8 ounces
	<hr/>
	20 ounces

(a) Follow the 5 per cent. *milk line* (top 24 ounces) to its intersection with the 12-ounce *line* (12 ounces is amount taken). This reads, fat, 3 per cent.



(b) Follow *12-ounce line* to *proteid line* and read, proteid, 2.1 per cent.

(c) Follow *12-ounce line* to *sugar line* and read, sugar (in the milk), 2.7 per cent.

(d) In C.-H. column read, 2 level tablespoonfuls of carbohydrate in 20 ounces equal 3.3 per cent. So, 2.7 per cent. sugar in milk plus 3.3 per cent. sugar added make 6 per cent. Hence the sugar will be just 6 per cent. in this mixture, and the mixture will be, fat, 3 per cent.; sugar, 6 per cent.; protein, 2.1 per cent.

Another example:—

e.g. Whole milk	.....	15 ounces
Lactose	.....	3 tablespoonfuls
Water	.....	5 ounces
		<hr/>
		20 ounces

4% *milk line* intersects *15-ounce line* at 3 %, hence, fat = 3 %  
*15-ounce line*     "     *proteid line*     " 2.6 "     "     proteid = 2.6 "  
*15-ounce line*     "     *sugar line*     " 3.4 "

We see that 3 tablespoonfuls are equal to 5 per cent. at the bottom of the column. Hence sugar in mixture is 3.4 per cent. plus 5 per cent., or 8.4 per cent.

This illustrates the common mistake of adding 5 per cent. of sugar to all mixtures no matter how many ounces of milk are used in the mixture, and disregarding the lactose in the milk itself. The chart gives an automatic check on the carbohydrate percentages.

If it is desired to give a lower or higher percentage of sugar than 6 per cent., say 5 per cent. or 7 per cent., it is simple to read the amount opposite the intersection of the *ounce line* with the *sugar line*, and then run up or down 1 per cent., by the small figures above the large ones indicating tablespoonfuls.

e.g. If 12 ounces of any milk are used in mixture, *sugar line* intersects *12-ounce line* at 2.7 per cent., opposite which read, 2 tablespoonfuls must be added to get 6 per cent. The small upper figure reads, 3.3 per cent. added carbohydrate.

To get 5 per cent., 1 per cent. less sugar must be added, so we run up the C.-H. column 1 per cent., by small upper figures in C.-H. column, to just under  $1\frac{1}{2}$  tablespoonfuls.

To get 7 per cent., run down 1 per cent. by upper figures to just over  $2\frac{1}{2}$  tablespoonfuls.

The chart may be used by the method of Rotch for modifying milk, using top milks with a high per cent. of fat and fat-free milk, by simply reading the percentages of each and adding.

*e.g.* To get a mixture containing fat, 3 per cent.; sugar, 6 per cent.; proteid, 1.25 per cent.

Using 16% milk, to get 3% fat, take  $3\frac{3}{4}$  oz. = fat, 3 % sugar, 0.85% proteid, 0.65% (16% milk line to 3% fat line.) Fat-free must be added to bring the proteid to the desired amount, *i.e.*, it must contain 0.6% proteid. This requires  $3\frac{1}{2}$  oz. and =

0.05 “	“ 0.8 “	“ 0.6 “
Total . . . . . “ $\frac{0.05}{3.05}$ “	“ $\frac{0.8}{1.65}$ “	“ $\frac{0.6}{1.25}$ “

There must be added 4.35% of sugar, or  $2\frac{5}{8}$  tablespoonfuls.

Dr. Ladd's table, based on Rotch's method, gives 16 per cent. milk,  $3\frac{3}{4}$  ounces; fat-free milk,  $3\frac{1}{2}$  ounces, and adds  $2\frac{1}{4}$  of his measure, which equals  $2\frac{7}{10}$  tablespoonfuls. These are exactly the figures obtained by the chart, with a slight discrepancy in the added carbohydrate.

The figures can be read as quickly from the chart as from a table, and with no arithmetic necessary save the simple additions.

The caloric value can be read, at the same time (see below),

16 per cent. milk, $3\frac{3}{4}$ ounces, contains	198	calories
Fat-free milk, $3\frac{1}{2}$ ounces, contains . .	35	“
Lactose . . . . .	105	“
Total . . . . .	338	“ in 20-ounce mixture

As to the accuracy of the chart in determining percentages, there are two possible sources of error:

(1) The method of obtaining top and skimmed milks is the usual one and is subject to the errors of the top milk method. The amount of fat in the original milk is, of course, the greatest source of error, and can only be eliminated by frequent analyses. The time of standing, the temperature at which the milk is kept, and any other factors which may influence the rising of the cream, will influence the amount of fat in the top and bottom

milks. The number of ounces which must be taken from the top to obtain different percentages of fat is given somewhat differently by different authorities. The method here given is an attempt to reconcile these differences, and is based mainly on Holt's figures.

(2) The other source of error is the possible variation of proteid and sugar in the different top milks. There is no doubt a slightly lower percentage of proteid in 20 per cent. milk than in skimmed milk. Rotch gives the following figures:—

Fat-free (fat, 0.05%)		4% milk.	8% milk.	12% milk.	20% milk.
Proteid ...	3.55%	3.5 %	3.35%	3.2 %	2.9 %
Sugar ....	5.1 "	4.76 "	4.55 "	4.35 "	3.95 "

It will be seen that there is very little variation in the proteid between fat-free milk and 12 per cent. milk. This is the part of the chart where most formulæ will be written and it is seldom that the high per cent. creams are used. The sugar error is also slight and may be neglected.

The second part of the chart has to do with caloric values, and brings in the oblique parallel lines, and the curved broken lines.

The oblique parallel lines are read at the intersection of the *milk lines* with the *ounce lines* (i.e., at the same point at which fat per cent. is read), and show the number of calories in the amount of milk used or, what amounts to the same thing, in the 20-ounce mixture. They connect points of equal caloric value, and so may be called the *isotherms*. They show the calories in the milk only and do not consider the added carbohydrate, the caloric value of which must be added in every case to obtain the calories in the completed mixture.

### III. TO DETERMINE THE CALORIES IN ANY MIXTURE.

(a) Read the intersection of the *milk line* used with the *ounce line* used, i.e., the number of ounces of milk taken in the mixture. This is at the same point at which fat per cent. is read. Read calories on the intersecting *isotherm*, or interpolate between the two nearest, i.e., calculate the number of calories according to the distance of the intersection from either of the two isotherms.

(b) Add the number of calories in the amount of carbohydrate added to the milk.

*e.g.* To determine the calories in

Whole milk (4%)	11 ounces	Fat.....	2.2%
Lactose .....	2 tablesps. =	Sugar. 2.5 % + 3.3% =	5.8 "
Water .....	9 ounces	Proteid .....	1.9 "
<hr/>			
20 ounces			

(a) The intersection of the 4 per cent. *milk line* with the 11-ounce line, also exactly intersects the 225 calory *isotherm*. Hence in the milk there are - - - - - 225 calories

(b) Add the calories in 2 tablespoonfuls lactose (small figure under the large 2 in the C.-H. column), - - - - - 80 "

Total calories in the mixture are - 

---

 305 "

(Arithmetical calculation of the above formula gives 304.1 calories.)

<i>e.g.</i> Milk, top 24, take	12 ounces	Fat.....	3 %
Dextri-maltose...	2 tablespoonfuls =	Sugar ....	6 "
Water .....	8 ounces	Proteid ...	2.1 "
<hr/>			
20 ounces			

(a) The intersection of the 5 per cent. *milk line* with the 12-ounce line is just above the 275 calory *isotherm*, say - - - - - 277 calories

(b) Add calories in added carbohydrate, 80 "  


---

 357 " in complete mixture

(Arithmetical calculation gives exactly 357 calories.)

#### IV. TO VARY THE STRENGTH OF THE MIXTURE WITHOUT CHANGING THE CALORIC VALUE.

Since the *isotherms* connect points of equal caloric value, the intersection of any *milk line* with the *isotherm* used will give identical caloric values. This considers the milk only. If the



same amount of sugar be added to all the different mixtures the resulting total calories in the mixture will be constant, but the sugar percentage will vary; while if the sugar percentage be kept constant, the caloric value of the mixture will vary according to the amount of sugar added.

<i>e.g.</i> 20	ounces of 2 per cent. milk	}	All have the same number of calories, 300.
17	" " 3		
14 $\frac{2}{3}$	" " 4		
13	" " 5		
11 $\frac{2}{3}$	" " 6		
10 $\frac{1}{2}$	" " 7		
9 $\frac{1}{2}$	" " 8		
8 $\frac{4}{5}$	" " 9		

Thus it is possible to raise or lower the percentage of fat or proteid without altering the calories in the milk.

<i>e.g.</i> Milk, 2%, 15 oz., = 225 calories	F., 1. %	P., 2.6 %
" 7 " 7 $\frac{4}{5}$ " = 225	F., 2.75 "	P., 1.38 "

To keep the caloric value of these two mixtures the same it is necessary to add the same amount of carbohydrate, and allow the sugar per cent. to vary.

Thus if 2 $\frac{1}{2}$  tablespoonfuls of sugar be added to each, the caloric value will be 325 in each case.

The sugar percentage in the first will then be 3.4

$$\begin{array}{r} 4.2 \\ \hline 7.6 \text{ per cent.} \end{array}$$

The sugar percentage in the second will then be 1.78

$$\begin{array}{r} 4.2 \\ \hline 5.98 \text{ per cent.} \end{array}$$

The caloric values on the chart have been calculated as carefully as possible, using the actual caloric value of each strength of milk. The method used was the usual one, allowing 9.3 calories per gram of fat, 4.1 calories per gram of sugar and proteid. One ounce is taken to weigh 29.25 grams, with an average specific gravity of 1.030 for milk. A difference of 2.7 calories for each 1 per cent. of fat is obtained. Holt gives a difference of 2.5 calories. This gives a correct caloric value for the

weaker milks, but there is an increasing error for the higher percentages of fat. It will be found that the chart reads within 0.9 of a calory in most instances, and often even more closely. The factor of error introduced by the variation of sugar and proteid in the milks with high fat content is so small as to be negligible.

It will be noted that the caloric value of the carbohydrates has been taken as 120 calories per ounce. This is a little too high, as shown by the following figures:—

	Calories per oz.	Level tablespoonfuls per oz.	Calories per level tablespoonful
Milk sugar .....	116	3.04	38
Cane sugar .....	116	1.87	62
Dextri-maltose ...	120	3.	40
Barley flour .....	102.5	3.3	35
Oat flour .....	115	2.95	39
Wheat flour .....	102.5	3.65	28
Soy bean .....	120	3.14	35
Cornstarch .....	103	2.94	35
Arrowroot .....	113	2.2	51.5+

The level tablespoonfuls per ounce and calories per level tablespoonful have been calculated by careful and repeated weighings.

It is seen that 120 is not far from correct for the sugars, and is a figure so much more easily handled mentally than 116, not only in adding, but in dividing into fractions, that it seems worth while to use it and disregard the small error. It gives an even figure, 40, for the value of a level tablespoonful, and 10 for each quarter tablespoonful. Since the value of the carbohydrate must often be added mentally, it is of some importance to have the simpler figure.

The level tablespoonful is not an accurate measure, but comes so near to one-third of an ounce with most spoons that the error is very slight. (Five different tablespoons tested held 146, 147, 143, 147.5, 136 grains of lactose respectively.)

Flours have a value of 102 to 117 calories per ounce. This gives 35-39 calories to a tablespoonful, average 37, and these figures may be used for absolute accuracy.

Cane sugar is a notable exception, having only 1.87 tablespoonfuls to the ounce, which gives a value of about 62 calories per tablespoonful. Arrowroot flour is also heavy, and gives 51

calories per tablespoonful. Wheat flour is light, giving only 28 per tablespoonful.

It is often convenient to use the value of the cereal gruel without computing the starch content. If gruels are made with one level tablespoonful of flour (about one-third of an ounce) to each pint of water, each ounce of gruel will contain one sixteenth of the caloric value of 1 pint, and since the flours average 105 calories per ounce, the value of 1 ounce of gruel will be—

$$\frac{1}{16} \times \frac{1}{3} \times 105 = 2.19$$

∴ calories per ounce is close enough.

Each ounce of the gruel will contain  $\frac{1}{16}$  of  $\frac{1}{3}$  ounce of flour, or  $\frac{1}{48}$  ounce. One ounce of flour in a 20-ounce mixture would give 5 per cent., hence  $\frac{1}{48}$  ounce will add  $\frac{1}{48}$  of 5 per cent., or 0.104 per cent. of flour for each ounce of gruel in 20-ounce mixture. But only 75 per cent. of this flour is starch; 75 per cent. of 0.104 per cent. = 0.078 per cent. Therefore, each ounce of gruel added to a 20-ounce mixture will add 0.078 per cent. to the carbohydrate percentage. 0.08 per cent. is a simpler figure and near enough for practical purposes.

	CALORIES.
<i>e.g.</i> Whole milk . . . . . 13 ounces	267
Barley water . . . . . 7 “	$= 7 \times 2 = 14$
Lactose . . . . . 2 tablespoonfuls	80
20	361

	PERCENTAGES.
Fat . . . . .	2.6 per cent.
Proteid . . . . .	2.28 “ “
Carbohydrate	
in milk . . . . .	2.9 per cent.
“ lactose . . . . .	3.3 “ “
“ gruel .. $7 \times .08 = 0.56$	“ “
Total per cent. carbohydrate ..	6.76 “ “

Thus far only the 20-ounce mixture has been considered. It has been pointed out that it is easy to write for 30, 40, 50, 60 ounces of mixture by multiplying the figures for 20 ounces by simple numbers, *i.e.*,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$  and 3. This can nearly always

be done mentally without much difficulty, or it is easy to write the formula for 20 ounces first, multiply by the desired factor and write the final formula. But when it comes to calculating the caloric value of any odd number of ounces an additional arithmetical operation is necessary, *i.e.*, dividing by 20 and multiplying by the number of ounces given the child. In order to save this calculation the third set of lines is added to the chart.

The horizontal lines are again used, but for another purpose. They represent the amount of mixture actually taken by the child, and may be called the *total ounce lines*. Each interval represents 2 ounces, as shown by the large figures just inside the left-hand margin of the chart, and they are read from above downward.

The *isotherms*, it must be remembered, represent the calories in 20 ounces. In reading the caloric value of a 20-ounce mixture they show the value of the milk alone. But they may also be used to represent the total value of the mixture after the milk is determined and carbohydrate is added. (See below.)

With these two sets of lines as ordinates the curved broken lines are plotted to show the calories in any number of ounces other than 20, and they may be called the *total calory lines*.

The relation of these three sets of lines is easily understood if it be noted on the chart that if 20 ounces contain 300 calories, the 300 *isotherm* intersects the 30-ounce line at 450 *total calory line*, and the 40-ounce line at 600 *total calory line*. In the same way, if 20 ounces contain 250 calories, 28 ounces will contain 350 calories, 36 ounces will contain 450 calories, etc. This part of the chart may be used in several ways.

#### V. TO DETERMINE THE CALORIES IN ANY NUMBER OF OUNCES OTHER THAN 20.

(a) Determine the calories in 20-ounce mixture.

(1) In the milk. Read on the *isotherm*.

(2) In the added carbohydrate. Read in left margin. Add these two.

(b) Take the *isotherm* representing *this sum* and follow to the line which corresponds to the total ounces to be given the child, *i.e.*, the horizontal *total ounce line*. Read at this point the *total calory line* (curved broken) or interpolate between the two nearest.



*e.g.* How many calories in 36 ounces of this mixture?

Milk, whole .....	12 ounces
Lactose .....	2 tablespoonfuls
Water .....	8 ounces

- (a) 1. Calories in milk = 245      Read on *isotherm*  
 2.    "    "    lactose = 80      "    "    C.-H. column

Total ..... 325

(b) Take the 325 *isotherm* and follow to 36-ounce line, and read on *total calory lines* about 585 calories.

In 28 ounces of the same mixture there will be just over 450 calories. This part of the chart reads within 5 calories, if carefully read.

If the calories in the 20-ounce mixture (milk plus carbohydrate) amount to more than 325, it is seen that the *isotherms* run off the chart before 40 ounces are reached. It is here necessary to take the *isotherm* representing one-half the calories in 20 ounces, follow to the desired total ounce line, read the total calory line, and multiply by 2.

The *isotherm* representing one-half the calories in 20 ounces is easily found if we note that the total calory lines intersect *isotherms* of one-half their value at 40-ounce line.

In other words, if the calories in 20 ounces are over 325 (milk plus carbohydrate), the simplest way to find the *isotherm* of half the value is to read the point where the equivalent *total calory line* intersects the 40-ounce line, take the *isotherm* through this point, follow to the desired *total ounce line*, read the total calories on the curved total calory line, and multiply this result by 2 (as the half value *isotherm* was used).

*e.g.* How many calories in 35 ounces of

5% milk (top 24 oz.) take 14 ounces	Calories in milk = 325
Lactose ..... 1½ tablespoonfuls	"    "    lactose = 60
Water ..... 6 ounces	
20 ounces	Calories in 20 ounces = 385

The 385 *isotherm* does not intersect 36-ounce line, hence to find *isotherm* of half the value, take point where 385 *total calory line* cuts 40-ounce line. Follow the *isotherm* through this point (*i.e.*, about  $\frac{7}{10}$  of the distance between the 175 and 200

*isotherms*) to the 36-ounce line. This point is just under the 350 total calory line, say 345. Twice this gives 690, which is within 3 of the correct answer, 693.

VI. Although the chart is based on a 20-ounce mixture, it can be used to estimate the CALORIC VALUE OF OTHER MIXTURES NOT MULTIPLES OF 20 OUNCES. Since the caloric values plotted by the isothermal lines represent the value of the milk alone, it is possible to read the value of any number of ounces of milk of any strength, no matter whether the milk be diluted to 20 ounces or to some other amount. If the milk be taken in a larger amount than is plotted on the chart, it is very easy to read the value of a half or a third of the amount taken, read the caloric value of the fraction and double or treble the figure read from the chart to get the value required. The value of the added carbohydrate must be added to obtain the total value of the mixture.

Percentages cannot be read, of course, for any other mixture than 20 ounces or a multiple thereof.

*e.g.* The caloric value of

Whole milk .....	24 ounces
Lactose .....	4 tablespoonfuls (level)
Water .....	12 ounces
	—
	36 ounces

From the chart it is easy to read the value of 12 ounces of whole milk, about 245 calories, twice that equals 490 calories.

The added lactose gives 160 “

Total ..... 650 “

<i>e.g.</i> Top 16 ounces, take .....	7 ounces
Lactose .....	3 tablespoonfuls
Barley water .....	17 ounces
	—
	24 ounces

From the chart read the value of the milk, 200 calories

Lactose ..... 120 “

Barley water .....  $17 \times 2 = 34$  “

Total ..... 354 “

VII. (A) TO DETERMINE THE MIXTURES WHICH WILL GIVE A  
REQUIRED NUMBER OF CALORIES IN ANY ODD  
NUMBER OF OUNCES.

This is perhaps the most useful way in which the chart may be employed. We usually start by knowing how much the child can take in a day in calories and in the total number of ounces. To calculate the different mixtures which will give the proper caloric value to the amount of food to be taken is no small task by arithmetical methods. With the chart the following method is used:—

(a) Subtract from the total number of calories to be given, the probable amount to be given as added carbohydrate. This need only be approximate and it will be found to work out correctly as a rule if 70 to 100 calories be allowed to each 20 ounces of food to be taken.

This leaves the number of calories which must be given in the milk.

(b) Follow *total calory line* representing this figure (calories to be given in the milk) to intersection with the *total ounce line* representing the ounces to be given the child. At this intersection read the *isotherm* or interpolate between the two nearest.

(c) Any *milk line* which intersects this *isotherm* will give the proper number of calories in the milk. Take any milk which intersects and read the per cent. of fat, proteid and sugar, and note whether the added carbohydrate checks with the amount subtracted originally.

*e.g.* It is desired to give 680 calories in 36 ounces.

(a) Subtract the calories to be given as carbohydrate, 100 to 20 ounces, 180 to 36 ounces, leaving 500 calories to be given in the milk.

(b) Follow 500 *total calory line* (curved broken) to the intersection with the 36 *ounces to be given line* (horizontal). At this intersection read the *isotherm* or interpolate between the two nearest. The 275 *isotherm* intersects.

(c) Any milk intersecting the 275 *isotherm* will give the proper number of calories in the milk.

(1) If we take the intersection of the 5 per cent. *milk line* with the 275 *isotherm* we shall have—

Milk, top 24 oz., take 12 oz.	24 oz.	F... 3 %
Water ..... 8 "	Or, 16 "	= P... 2.1 "
Carbohydrate to 6% . 2 tablesps.	4 tablesps.	C... 6 "
<hr/> 20 oz.	<hr/> 40 oz.	

But this will only add 80 calories in 20 ounces in carbohydrate, or 140 in 36 ounces.

It is therefore necessary to make the sugar per cent. higher, *i.e.*, if the sugar be raised to 7 per cent., or about  $2\frac{1}{2}$  tablespoonfuls to 20 ounces, it will add 100 calories to 20 ounces, or 180 to 36 ounces. This can be easily read by running down the C.-H. column from 80 calories which 2 tablespoonfuls give, to 100 calories in  $2\frac{1}{2}$  tablespoonfuls.

(2) If we take the intersection of the 6 per cent. *milk line* with the 275 *isotherm*—

Milk, top 20 oz., take $10\frac{1}{2}$ oz.	21 oz.	F... 3.2%
Water ..... $9\frac{1}{2}$ "	Or, 19 "	= S... 1.9 "
Carbohydrate to 6% . $2\frac{1}{4}$ tablesps.	$4\frac{1}{2}$ tablesps.	P... 6 "
<hr/> 20 oz.	<hr/> 40 oz.	

Here again more than 6 per cent. sugar must be used, as  $4\frac{1}{2}$  tablespoonfuls will add but 180 calories in 40 ounces, or 162 in 36 ounces.

200 calories,  $2\frac{1}{2}$  tablespoonfuls of carbohydrate, added in 40 ounces will give a sugar per cent. of 2.4 plus 4.2, or 6.6 per cent.

(3) If we take 9 per cent. *milk line*, it intersects the 275 *isotherm* at 8 ounces. This will give—

Milk, top 12 oz., take 8 oz.	16 oz.	F... 3.65%
Water ..... 12 "	Or, 24 "	= P... 1.4 "
Sugar to 6% ..... $2\frac{1}{2}$ tablesps.	5 tablesps.	S... 6 "
<hr/> 20 oz.	<hr/> 40 oz.	

This will add the exact amount of carbohydrate calories that was originally subtracted. But it has a rather high fat and low proteid, and this may be undesirable.

(4) We can go back and subtract a smaller amount for the carbohydrate from the total calories it is desired to give if none of the above possibilities seem desirable. If only 140 be subtracted from the 680 calories it leaves 540 to be given as milk. The 540 *total calory line* intersects the 36-ounce *given line* at the 300 *isotherm*. On this *isotherm* the 5 per cent. *milk line* gives—



Milk, top 24 oz., take 13-oz.	26 oz.	F...3.25%
Water .....	7 " Or, 14 "	= P...2.3 "
Sugar to 6% .....	$1\frac{7}{8}$ tablesps.	$3\frac{3}{4}$ tablesps. S...6 "
	<hr/> 20 oz.	<hr/> 40 oz.

This adds 150 calories in 40 ounces, or not quite 140 in 36 ounces.

If 4 tablespoonfuls of sugar be added, it will add 160 in 40 ounces, or 144 in 36 ounces and the sugar per cent. will be  $2.9 + 3.3 = 6.3$  per cent.

Either of these is very near the original amount subtracted for carbohydrates.

(5) If it is desired to save the trouble of estimating the proportion of the carbohydrate which is actually used, it is easy to mix the milk and water to 40 ounces—take 36 ounces of the mixture and dissolve in it the exact amount of carbohydrate desired. This can only be done when the sugar is an easily soluble one, and cannot be done in the case of starches, where cooking is necessary.

Another example:—

To give 450 calories in 28 ounces,

(a) Subtract 150 from 450, leaving 300 calories to be given in milk.

(b) 300 *total calory line* intersects 28-ounce *to be given line* at about 215 *isotherm* (interpolated between the 200 and 225).

(c) 6 per cent. *milk line* intersects 215 *isotherm* at  $8\frac{1}{2}$ -ounce.

This gives—

Milk, top 20 oz., take $8\frac{1}{2}$ oz.	17 oz.	F... 2.5%
Water .....	$11\frac{1}{2}$ " Or, 23 "	= P... 1.5 "
Sugar to 6% .....	$2\frac{1}{2}$ tablesps.	5 tablesps. S... 6 "
	<hr/> 20 oz.	<hr/> 40 oz.

This adds 200 calories in 40 ounces or 150 in 30 ounces, or 140 in 28 ounces.

So it is necessary to add a little more sugar, roughly 108 calories to 20 ounces, or nearly  $2\frac{3}{4}$  tablespoonfuls in 20 ounces,  $5\frac{1}{2}$  to 40 ounces.

It has been impossible to draw the chart so that all the total calory lines shall intersect every isotherm, and it is necessary to double the total calories desired and the number of ounces to be given, in the upper left-hand corner of the chart.

*e.g.* It is desired to give 150 calories in milk, in 20-ounce total.

The 150 total calory line does not intersect the 20-ounce line on the chart, but if both figures be doubled it is seen that the 300 total calory line does intersect the 40-ounce line on the 150 isotherm.

Similarly, the 200 total calory line does not intersect the 30-ounce line, but by doubling both, the 400 line intersects the 60 ounce line at about 133 isotherm.

Once on the correct isotherm any milk may be selected.

In the same way the 800 total calory line does not intersect the 50-ounce line, but by taking one-half of each figure it is found that the 400 line does intersect the 25-ounce line at about the 320 isotherm.

VII. (B) ANOTHER METHOD OF DETERMINING MIXTURES WHICH WILL GIVE DESIRED CALORIES IN ANY GIVEN NUMBER OF OUNCES is as follows. It differs simply in the point at which carbohydrate calories are subtracted:—

(a) Take *total calory line* which represents calories it is desired to have in food actually taken. Follow this to the *total ounce line* which corresponds to amount to be taken. At this intersection read the *isotherm*, which gives the number of calories which the 20-ounce mixture must contain.

If the *total calory line* does not intersect the desired *total ounce line* on the chart, take a line which represents one-half the amount, read the *isotherm* as before and multiply its value by 2.

This gives, then, the calories which the 20-ounce mixture must contain. Since part of this must be added carbohydrate, it is necessary to decide about how many calories of the mixture shall be composed of carbohydrate. This will vary with the amount of milk which is to be used, and it will be easily seen by a few examples how this is determined.

*e.g.* It is desired to give 450 calories in 28 ounces.

The 450 *total calory line* intersects the 28-ounce line at about 320 *isotherm*, hence the 20-ounce mixture must contain 320 calories. If 70 calories of this be subtracted for added carbohydrate it will leave 250 in the milk. Any milk which intersects the 250 *isotherm* will then give the correct number of calories in the mixture.

But it is readily seen that if 70 calories of carbohydrate be

allowed for carbohydrate, this adds 2.9 per cent. of sugar, and by following the horizontal line through the point opposite 70 calories ( $1\frac{3}{4}$  tablespoonfuls in the C.-H. column), it is found that the *sugar line* is cut at the 14-ounce vertical line. Hence we must add 14 ounces of milk to the mixture to keep the sugar at 6 per cent. The 14-ounce line intersects the 250 *isotherm* on the 3 per cent. *milk line*. Therefore, to get 320 calories in 20 ounces we take—

Milk, 3 per cent. . . .	14 ounces	250 calories
Carbohydrate . . . . .	$1\frac{3}{4}$ tablespoonfuls	= 70 "
Water . . . . .	6 ounces	
	<hr/>	
	20 "	320 "

If 80 calories be allowed for the carbohydrate it leaves 240 for the milk. The line through 2 tablespoonfuls (80 calories) cuts the *sugar line* at  $11\frac{3}{4}$ -ounce line (vertical). This vertical line intersects the 4 per cent. *milk line* at about 240 *isotherm*, therefore—

Milk, 4 per cent. . . .	$11\frac{3}{4}$ ounces	244 calories
Lactose . . . . .	2 tablespoonfuls	= 80 "
Water . . . . .	$8\frac{1}{4}$ ounces	
	<hr/>	
	20 "	324 "

In the same way if 100 calories be taken as carbohydrate, 220 will be left for the milk. This fixes the amount of milk in the mixture at 8 ounces. The 8-ounce line intersects the 220 *isotherm* at a point midway between the 7 per cent. and the 6 per cent. *milk lines*. It is possible then to choose either one, which will give about 227 and 205 respectively. It is, of course, possible to take a milk which contains  $6\frac{1}{2}$  per cent. of fat by taking off the top 18 ounces from the bottle, which will give about 220 calories in 8 ounces.

In the above examples the sugar has been kept at 6 per cent. This is not necessary, of course, and it is simpler at times to have it higher or lower.

Another example.

It is desired to give 700 calories in 35 ounces. The 700 *total calory line* does not intersect the 35-ounce line, so it is necessary to take one-half the amount, 350. The 350 *total calory line* in-

tersects the 35-ounce line at the 200 *isotherm*. Twice this equals 400, so each 20 ounces of the mixture must contain 400 calories.

If 80 calories be taken for carbohydrate it will leave 320 for the milk. The horizontal line from 2 tablespoonfuls (in C.-H. column, or 80 calories) intersects the *sugar line* at the 12-ounce line (vertical). This 12-ounce line intersects the 6 per cent. *milk line* at about 310 calories, read on the *isotherm*, or  $6\frac{1}{2}$  per cent. milk would give 320 calories. Hence

Milk, top 18 ounces ( $6\frac{1}{2}\%$ ), take	12 ounces	320 calories
Lactose .....	2 tablesps. =	80 "
Water .....	8 ounces	
	<hr/> 20 "	<hr/> 400 "

If it is desired to give a whole milk mixture in the above example to get 400 calories in 20 ounces, it is necessary to either use whole milk undiluted or to raise the sugar above 6 per cent. If 16 ounces of whole milk be used, it will give 325 calories. By following the 16-ounce line to the *sugar line*, the sugar in the milk is seen to be 3.6 per cent. But only 60 calories can be added to bring the sugar to 6 per cent., and this only gives 325 plus 60, or 385 calories in 20 ounces. To get 400 calories we must add 75 calories, or about  $1\frac{7}{8}$  tablespoonfuls to each 20 ounces. This will bring the sugar in the mixture to 3.6% in the milk

3.1 " " " lactose added
<hr/>
6.7 " total

VIII. At the bottom of the chart are plotted the following:—

(a) THE CALORIES NEEDED IN TWENTY-FOUR HOURS. This is the broken line which is slightly and irregularly curved, near the 1 per cent. *milk line*. It is plotted to read the weight of the child in pounds or kilos at the bottom of the chart and calories at the right. It is based on a requirement of

130 to 120 calories per kilo for the lowest weights
100 " " " " " middle "
100 to 90 " " " " " highest "

This is according to most authorities, but it will be found difficult to write a rational formula which will give as high a caloric value for the low weights.

For example. In the last edition of a standard text-book the



following formula is written for a child of two weeks weighing 8 pounds:—

5% milk,	5 ounces	F., 1.25%	} and contains	
Lactose,	1 “	From chart = S., 6.1 “		} in milk, 115 cal.
Water,	15 “	P., 0.9 “		
	—			
	20		231 “	

Feed  $2\frac{1}{2}$  ounces 8 times a day = 20 ounces.

The same chapter states that children must be given 100 calories per kilo at the third week. 8 pounds = 3.66 kilos, hence the above child should have 366 calories. The formula furnishes 231.

To obtain 366 calories about  $10\frac{1}{2}$  ounces of 5 per cent. milk must be used, or the sugar must be raised to more than 6 per cent.

It is also stated and frequently quoted that a child of six months requires 100 calories per kilo, and that at the end of the first year the requirements fall to 85-75 calories per kilo.

At six months a child weighs 7.25 kilos, and at 100 calories per kilo needs 725 calories.

At twelve months a child weighs 9-10 kilos, and at 80 calories per kilo needs 720-800 calories.

It seems rather against common experience to say that there is so little difference in the requirements of these two ages.

In order to prevent the curve representing calories required per day from actually slanting downward, it has been necessary to keep the energy quotient up above 90 for the last few months.

The chart considers normal children only. Children under weight, with marasmus, etc., undoubtedly need a higher energy quotient than normal children.

(b) THE NUMBER OF FEEDINGS IN TWENTY-FOUR HOURS and the OUNCES AT A FEEDING are also plotted on the lowest broken lines. Read weight and age at the bottom of the chart, and number of feedings and amount of each at the right. These figures are only averages and are not meant to be taken as absolute.

*e.g.* A child of 8 pounds needs 400 calories per day, and can take about 3 ounces 7 to 8 times a day.

A child of 15 pounds needs 675 calories and can take 6 ounces (5 to 7 ounces) 6 (5 to 7) times a day.

(c) The lowest line of figures gives the AGE IN MONTHS (from Holt), and from it can be read the average weight for any given age. It is an easy method of determining whether the child is about average or not, and in the case of children who depart from the normal, it gives an easy method of obtaining an average between the weight and that age.

*e.g.* A child of five months weighing 9 pounds can often be fed like a child of three months weighing  $12\frac{1}{2}$  pounds.

CONCLUSIONS.—In the use of a chart like this there are certain advantages and disadvantages to be considered.

The *advantages* are here summarized:—

(1) Advantages over the methods involving the use of formulæ and arithmetical calculations.

(a) It is possible to write a formula for any percentage of fat, sugar and proteid, or to determine the strength of any given formula, without any arithmetical process except the simple multiplication, when a 30, 40 or 50 ounce mixture is used.

(b) The caloric value of the mixture can be read at the same time with no extra effort, except the addition of the calories in the added carbohydrate.

(c) The caloric value given can be kept constant, while the fat and proteid can be changed in either direction. By arithmetical methods this often takes several trial calculations.

(d) All the possible dilutions are in plain view at the same time.

(2) Advantages over the use of printed tables of figures.

(a) To the writer's mind it is easier to read a plotted line than to follow a line of figures. The value and force of any graphic method of representing series of figures is a matter of common knowledge. The use of curves on temperature charts, blood pressure and weight records is so common that it would be impossible to conceive of going back to tedious rows of figures. After a little use the milk chart acquires a graphic force which makes the strength of the various milk dilutions stay in the mind, gives a mental image of the various formulæ which may be compared with the mental pictures which we all carry of the temperature curves characterizing typhoid, measles or scarlet fever.

(b) It is impossible to superimpose tables of figures so that percentages and caloric values can be read at the same time.

(c) Oblique lines of equal value are very much harder to follow in tables.

*Disadvantages:—*

(1) Difficulty in learning to use the chart. This is not as great as seems at first glance. The criss-cross of lines is confusing until the principle of the chart is understood. If it be considered as two superimposed charts, it is as easy to throw out of consideration the lines not being used as it is to use the microscope with both eyes open.

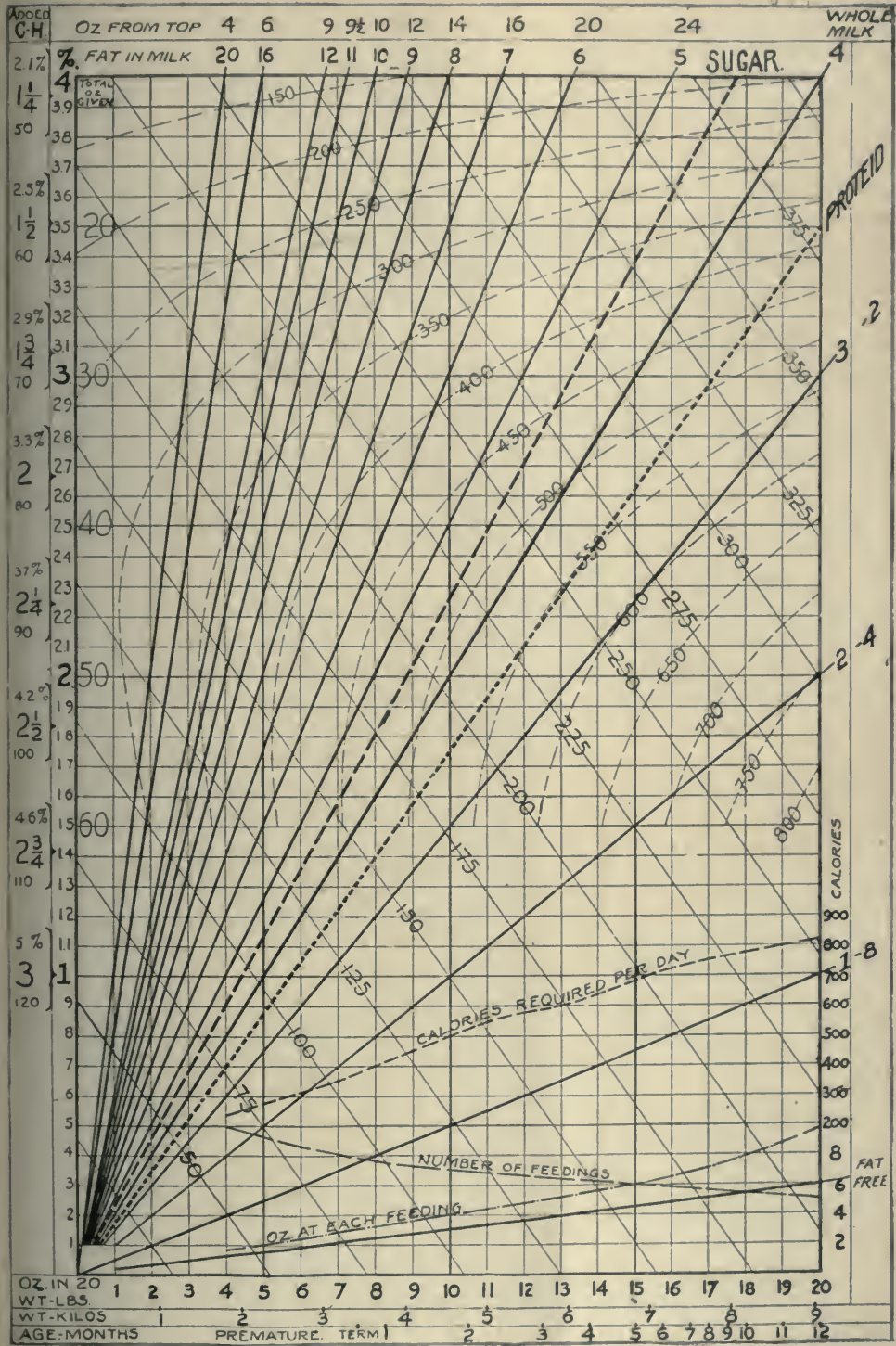
It is somewhat difficult to describe briefly and accurately the manner of use of a graphic chart, but the writer has had no difficulty in making it perfectly simple in five minutes' time to anyone to whom he has been able to explain it. It takes longer to read and follow printed directions, but the ultimate saving of time and effort would seem worth the effort.

(2) The necessity of carrying the chart about in the pocket is a disadvantage, but this is shared by formulæ and tables of figures. If one memorizes the formulæ, it is necessary to substitute the proper values and go through several arithmetical processes. It is interesting to go through the various text-books and note the simplest means of writing milk formulæ. Each calculation takes a paragraph, which is often of considerable length, and at times surprisingly far from correct. The saving of time and effort with this chart are worth the trouble of carrying it in the pocket.

(3) It may be said that one becomes dependent on such an artificial aid and in its absence is helpless. This may be true to a certain extent, but in practice it is found that the graphic force of the chart is such that it impresses the facts which it represents on the mind as does no other method. The writer finds himself able to visualize the main lines quite correctly, and write formulæ with the image of the chart which has impressed itself on his memory.

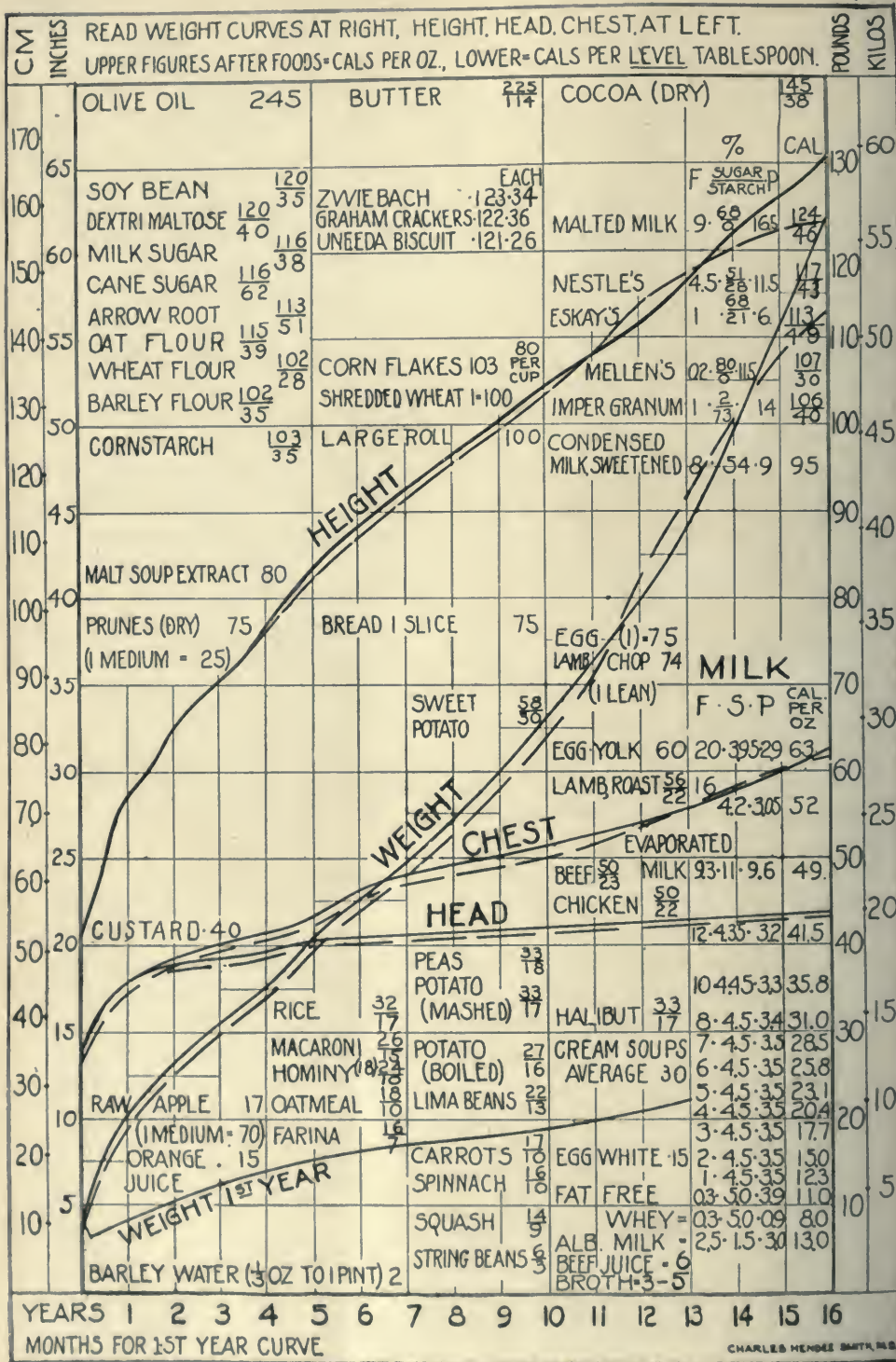
(4) The 20-ounce mixture or multiple of 20 ounces may be considered a disadvantage to many who are accustomed to write formulæ for the odd number of ounces which are actually to be given to the child. Such a plan has, of course, the value of not making a larger amount of food than is actually intended to be given. Perhaps in hospital work, where the formula is written separately for each child, this may be a factor of importance.





Extra copies of this chart may be obtained from Dr. Smith. It is almost essential to have the chart constantly in front of one when reading the text.





YEARS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16  
 MONTHS FOR 1ST YEAR CURVE

But in private practice, or in hospitals where the 20-ounce mixture is used as a standard habitually, this is not an objectionable feature, but a decided advantage. Nearly all mothers like to have a larger amount of food made than is intended to be given, so as to have an extra bottle, or at least part of a full feeding, to fall back upon in case of accidental breaking of a bottle, delay in delivery of the milk and so on.

When a mixture is made up to 32, 36, 42 ounces, etc., the problem of percentage calculation becomes almost hopeless, except in the case of very simple mixtures, such as equal parts of milk and diluent, 2 to 1, 3 to 1, etc. The estimation of caloric values becomes simple enough if only whole milk mixtures be used, but if top or skimmed milk be used the problem at once becomes considerably more complicated.

The writer does not wish to be understood as being in favor of the practice of "juggling percentages," but it is a satisfaction to be able to determine quickly and accurately the percentages and caloric values without introducing new factors of error in the method of calculation, errors which are inevitable because the arithmetical processes are so elaborate that their very length forces us to take inaccurate short cuts.

## II.

On the reverse side of the chart there are—

(1) CURVES SHOWING THE GROWTH of the average child up to sixteen years, indicating the weight, height, circumference of the head and of the chest. A weight curve is also plotted for the first year by months.

The weight curves are read in years for the sixteen-year curve, in months for the first-year curve, at the bottom of the chart, and in pounds and kilos at the right.

The height, head and chest curves are read in years at the bottom, and in inches and centimeters at the left.

Boys are shown by the solid lines, girls by the broken lines.

These curves have been added to the chart, since the figures they represent are frequently used, and must either be carried in the pocket in tabular form, or memorized. The curves have the advantage of showing the periods of greatest growth, the earlier advent of puberty in girls, and so forth, in a way which can never be seen from tables of figures, and can be read quite as easily as tables of figures.

(2) THE CALORIC VALUE OF THE FOODS most commonly given children. These are arranged on the same table as the weight and height curves. This is perhaps somewhat incongruous, but has been done to save space, so that the two sides of the chart might contain as much information as possible.

It is advantageous to have at hand the caloric value of the foods which are given in the second and succeeding years of childhood, because it is often important to calculate the exact amount a child is taking, not only in acute illness, such as typhoid, but also in the more chronic, but no less important, cases of over- or underfeeding so commonly seen.

It is not easy to find satisfactory figures for a mixed diet. Tables are given by many writers, but in such form that it is impossible to use them except in the laboratory or hospital, where the food can be weighed or accurately measured. Caloric values in these tables are given in pounds or ounces, or in the metric system, in "portions" of 100 calories each (Fisher), or in rough measure, such as "a small portion," "a large serving," "a heaping tablespoonful," a "rounded teaspoonful," etc. Needless to say, these measures are hopelessly inaccurate, and the accurate weights can only be used under extraordinary circumstances. Both are impracticable in private or dispensary work, where directions must be given mothers or nurses.

In an effort to find a measure which can be used easily and quickly in private life and also in institutions, the various foods have been measured and weighed with the different spoons found in every household.

Teaspoons vary greatly, and are too small for convenience.

Tablespoons vary much less, and if the contents are scraped off level with the back of a table knife we have a measure which is very nearly constant. Many different tablespoons have been tested, including silver, plated, common tin, nickel plated and aluminum.

The error in filling and leveling any one spoon is very small, the difference on several trials being only  $\frac{1}{2}$  to 2 grains when substances like sugars or flours were used. With different spoons the variation is surprisingly slight, and gives a negligible error when the caloric value of the small differences is considered.

So we have in the *level* tablespoonful a measure which is quite accurate, one which is always at hand, and which is large enough



to require filling but a few times for any ordinary portion of food.

The various foods are placed on the chart so that their position indicates their relative value, so far as possible. The scale on the right, which indicates pounds on the weight curve, has been used. It is seen at a glance that carbohydrates have high fuel value, green vegetables low, etc.

So far as possible the various foods have been grouped in vertical columns, the carbohydrates, vegetables, meats and various milk products from left to right.

All the foods which are commonly served in a cooked condition are given in the table as cooked.

The caloric values of the foods have been written after each in the form of a simple fraction. The upper figure represents calories per ounce, the lower represents calories per level tablespoonful. By reducing this fraction to a decimal the number of level tablespoonfuls per ounce may be obtained if desired. Thus milk sugar is followed by the figures 116

$$\frac{116}{38}$$

This means that 1 ounce yields 116 calories, 1 level tablespoonful yields 38 calories, and, by reducing the fraction, there are 3.04 tablespoonfuls per ounce.

Liquids are given in fluid ounces only. Crackers, bread, eggs, etc., are given for single pieces or single articles. These are indicated on the chart.

Vegetables, etc., are mashed fine and packed into the spoon.

Cereals vary so much in water content when cooked that it is necessary to have them made up in a definite strength. They are here given as made according to directions given on packages of each. For example, farina and cream of wheat are made with  $\frac{3}{4}$  cup of dry cereal to 1 quart of water; oatmeal (H-O) with 1 cup to 1 pint, etc.

The value of 1 tablespoonful of the cooked cereal has been found by weighing the dry cereal put into a definite amount of porridge, and measuring the number of tablespoonfuls of the porridge. From this the calories per tablespoonful were calculated and checked by the figures given by Fisher, Farr and Atwater, for cooked cereals.

The usual "tablespoonful" of cereal—heaping or rounded—



depends entirely on the thickness of the cereal, its temperature, and the amount heaped on the spoon, and varies from 3 to 6 level tablespoonfuls. It is rather more trouble to measure level tablespoonfuls, but there is no question as to the greater accuracy.

Meats are given in ounces and tablespoonfuls, the latter being measured by chopping the meat fine and packing it into the spoon. It is convenient to remember that a cube of cooked meat,  $1\frac{1}{4}$  inches on a side weighs about 1 ounce.

Some of the proprietary foods have been placed on the chart, with the percentage of their constituents, and their caloric values. It is often convenient to be able to determine what a child has been getting who has been on one of these foods. At times it may be desirable to prescribe them. The percentages are given in the order indicated at the top of the column—fats, sugars over starches, proteids. The calories are given as a fraction calories per ounce over calories per level tablespoon.

The following examples illustrate the comparative ease with which the value of a child's diet may be obtained:—

FOR A CHILD OF THREE YEARS, WEIGHING 30 POUNDS.

		Level tablespoonfuls.	Calories per table- spoonful, oz., etc.	Total calories.	
8 A.M. Breakfast.					
Oatmeal	.....	4	×	10	40
Milk, whole	..... 8 ounces		×	20.4	163.2
Toast	..... 1 slice		×	75	75
Butter	.....	$\frac{1}{4}$	×	114	28.5
11 A.M.					
Graham crackers	. 2		×	36	72
1 P.M. Lunch.					
Beef, chopped round		2	×	23	46
Mashed potato	..	2	×	17	34
Spinach	.....	3	×	10	30
Bread	..... 1 slice		×	75	75
Butter	.....	$\frac{1}{4}$	×	114	28.5
Junket, milk	.... 4 ounces		×	20	80
sugar	...	$\frac{1}{4}$	×	62	15.5
4 P.M.					
Orange juice	.... 4 ounces		×	15	60

6 P.M. Supper.

Milk .....	8 ounces	}	×	20.4	163.2
Toast .....	1 slice		×	75	75
Zwieback .....	1 piece		×	34	34
Prunes, stewed ..	4		×	25	100
					<hr/> 1,118.9

Weight of child, 30 pounds, 37.3 calories per pound

" " " 13.6 kilos., 82 " " kilo.

A CHILD OF 40 POUNDS SUFFERING FROM A MILD TYPHOID  
RECEIVED THE FOLLOWING IN ONE DAY.

8 A.M.

Cream soup,	Milk .....	4 ounces	×	20.4	81.6
	Wheat flour ..	1 tablesp.	×	28	28
	Oyster juice	?			
Crackers,		2	×	25	50

11 A.M.

Albumen water,	Orange juice .	4 ounces	×	15	60.
	White of 1 egg		×	15	15
	Lactose .....	1 ounce	×	116	116
	Water .....	4 ounces			

1 P.M.

Junket	Milk .....	7 ounces	×	20.4	142.8
	Lactose .....	1 ounce	×	116	116

5 P.M.

Cocoa,	Cocoa .....	¼ tablesp.	×	38	9.5
	Milk .....	4 ounces	×	20.4	81.6
	Lactose .....	2 tablesps.	×	38	76
	Water .....	4 ounces			
Crackers		1			25

8 P.M.

Orange-egg,	Orange juice .	4 ounces	×	15	60
	1 whole egg ..		×	75	75
	Lactose .....	1 "	×	116	116

12 P.M.

Soup.	Cream of pea .	4 ounces	×	30	120
	Milk .....	4 "	×	20.4	81.6
					<hr/> 1,254.1

Calories per pound, 31.4

" " kilo., 69.0

The original charts were drawn on tracing cloth and negatives were made, so that prints can be made full size for demonstrations, etc. These are 24 x 34 inches. The reduced charts are in two sizes, 5 x 7, for desk use and 3¼ x 4¼ for the pocket. The smaller size can be reproduced on celluloid.

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RAPID METHOD OF EXAMINATION OF THE STOOLS OF NURS-LINGS AND INFANTS; APPRECIATION OF THE BILIARY, INTESTINAL AND PANCREATIC FUNCTIONS.—H. Triboulet (*Jour. de Méd. de Paris*, July 17, 1909) recommends a rapid and correct method of examination of the fresh stools of infants and children, which tells us the condition of the biliary, pancreatic and intestinal functions. The test is made by mixing a portion of the stool with distilled water and agitating it in a test-tube. There are then added 8 to 10 drops of a solution of sublimate in acetic acid and distilled water. The tube is set upright and kept for one-half to two hours, or, still better, for twenty-four hours. In normal infants there is produced a rose-colored fluid with a troubled portion above and a rose-colored precipitate. Such a precipitate always indicates normal function of the digestive tube and liver. But in abnormal conditions green and other shades appear instead of rose. The coloration is due to oxidation of the bile pigments. In the early life of the nursling, a normal green coloration may be obtained, but as he grows older this is never a normal reaction. The rose color is that of hydrobilirubin. The nursling at the breast without fever gives a green to a rose reaction. An older infant gives a vivid green precipitate with a rose-colored troubled liquid when he has plenty of bilirubin in the intestine, or when the intestine carries out energetic oxidation, or when it is insufficient for the reduction of hydrobilirubin. A light green or yellow to gray color indicates insufficiency or poor quality of bile or that the intestine is altered in its oxidizing and reducing cellular elements.—*American Journal of Obstetrics.*

## CLINICAL NOTE.

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### CASES OF INFANTILE SCURVY.

BY CONWAY A. FROST,  
Utica, N. Y.

In an article by W. P. Northrup in the September number of the ARCHIVES OF PEDIATRICS, my attention was called to the fact that men graduated in the past ten years seldom saw cases of infantile scurvy, and that a case might easily be mistaken for some joint disease or even poliomyelitis. Some of the difficulties of diagnosis were brought to my mind by 3 cases in my private practice, so that I am led to report the following: In January I was called to a child two years old; the physician in charge, a man graduated in the past ten years, gave me a history of the case; apparent paralysis, with marked tenderness, which he had mistaken for rheumatism. The child had been sick for two weeks with diarrhea, was unable to move the leg and lay on her back with thighs and legs slightly flexed and a slight rotation outward at the hip, general appearance anemic and undernourished. Upon examination I found a slight rise in temperature which had been quite constant for the previous two weeks, slight swelling of the ankle joint and at both knees. The knees had a purplish tinge, and on attempting to move the legs the child fretted, and when an attempt was made to have the child step upon the feet she cried with pain. Urine showed trace of albumen. In looking for evidence of hemorrhage I found bleeding from the nose had occurred two or three times and some evidence of slight hemorrhage from the gums with an occasional bloody stool. No marked signs of rachitis. I found the child had been brought up on condensed milk, though of late the diet had been enlarged somewhat by adding cereal and bread and butter. I hesitated giving fruit on account of the diarrhea, but thought best to try orange juice in spite of this and a more liberal diet. I saw the "miracle" performed that Dr. Northrup mentions.

CASE II.—In July I was called to see a baby fifteen months old who was suffering from a catarrhal diarrhea and occasional vomiting and was fast losing ground. He was being fed on one



of the proprietary foods. The appearance was markedly anemic, with some evidence of rachitis, with temperature of 100° F., pseudoparalysis of both legs and slight inability to move left arm, marked tenderness when attempting to move the child, some swelling at the knees and slight discoloration at joint, no evidence of hemorrhage at mouth. I suspected scurvy, but the diarrhea was so profuse I decided not to give orange juice. As the family were foreigners I dared not trust to given directions, so for several days I made, at their home, a purée of potato and administered it to the child myself, who fought my efforts vigorously, but as both legs and one arm were comparatively out of commission I managed to force him to take the food. After a few days, when the diarrhea was checked, I added scraped meat and orange juice and whole milk. I was rewarded by seeing the child recover.

CASE III.—Within the past week I was called to see a child with paralysis of left leg and great tenderness, with history of preceding diarrhea. The marked tenderness made me hope to find some of the symptoms of scurvy, but further examination, with the history, together with electrical reaction, flaccid type of paralysis, no evidence of swelling or hemorrhage, I was forced to abandon any diagnosis with so favorable prognosis.

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OPERATIVE TREATMENT OF FRACTURES IN CHILDREN.—H. H. Sampson (*Lancet*, August 17, 1912) concludes that the treatment of simple fracture by open operation gives more perfect results than can be obtained by any other method at present in general use. With reasonable care the dangers of such treatment are negligible. The mortality has been *nil*, and no instance of wound infection has occurred in a complete series of cases. The insertion of a metal plate gives no trouble after a clean operation. Operative treatment should be applied to recent fractures, and not reserved for the imperfect results of conservative measures. The chance of a perfect result being obtained is diminished by the length of the period which elapses between the accident and the operation. Rarefying osteitis and sinus formation do not occur after a clean operation. In view of these results, it is reasonable to urge the more extended adoption of Lane's methods for the treatment of simple fractures.—*Medical Record.*

## SOCIETY REPORTS.

### THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

*Stated Meeting, Held October 7, 1912.*

WILLIAM M. POLK, M.D., CHAIRMAN.

THIS meeting was held under the auspices of the Section on Pediatrics.

#### THE ETIOLOGY OF CONVULSIONS IN EARLY LIFE.

DR. FLOYD M. CRANDALL read this paper. (See page 803.)

#### GENERAL REMARKS ON THE PATHOGENESIS OF CONVULSIONS AND ALLIED CONDITIONS.

DR. MAX G. SCHLAPP said: There is no doubt but that all have seen single attacks of epilepsy occurring in children that were apparently caused by intestinal worms, and after the removal of the worms the epileptic attacks disappeared. When 6 or more epileptic attacks often appeared, these are not due to intestinal worms but to other causes. The same might be said regarding teething or irritations of the stomach. We are dealing with a subject which is very complex, one that has many causes. We should consider what causes operate on the motor nervous system through irritation. Of course it is well known that organic lesions in the cerebral cortex, hemorrhages, tumors, gliosis, etc., produce convulsions in children. When we consider those due to reflex irritation or to causes that we do not understand, we are entering upon a big field which requires deeper investigation.

As Dr. Crandall remarked, epilepsy occurs more frequently during early life, and when it occurs later it is called "epilepsy retardans." Most cases of epilepsy retardans are due to some organic lesion of the brain, especially those lesions resulting from hemorrhage, tumors, gliosis, syphilis, etc. Idiopathic

epilepsy develops during early life and not after the age of thirty years. In connection with this three stages present themselves for discussion: (1) The formative. In this each cell divides and forms new cells. (2) The functional. In this each cell may be shown to be capable of taking some sort of substance in the body and keeping it as potential energy. (3) The nutritive. Here each cell uses up this potential energy and converts it into kinetic energy.

There is something in the body which regulates these three processes and that something is a chemical substance. The formative activity is very active in the fetal period of life and there appear certain chemical substances after a certain period. When these develop the growth of the individual processes ceases. This cessation of growth may be on account of the absence of a certain hormone; the stimulation to activity of this certain hormone retards the formative activity.

There is a class of glands in the body which are important in retarding growth because they produce and develop these hormones. These are the glands which control sexual characteristics.

With regard to the nutritive activity, there are substances which control that as well as those that control the functional activity. There is something in the system which keeps the threshold of nerve cells constant. (Dr. Schlapp then spoke of hyperthyroidism and its effect upon the functional activity of the motor neurons, and those contained in the vagus in particular where the action was tremendous.) If strychnin is administered there is at once an enormous lowering of the threshold of activity of the peripheral motor neurons. We can, therefore, arrest the threshold of activity of motor cell activity by the employment of certain chemical substances. Morphine is an example of this. There are many things which regulate this threshold of activity. It is interesting in this connection to note that all neurons do not react alike to the different hormones. It should be borne in mind that the nervous system is made up of a number of groups of neurons which react to a great number of poisons, such as lead. The musculospiral nerve is one of those specially affected, thus showing that there is something specially selective. Epilepsy is always a lowering of the threshold of central motor neuron activity.

In children who have suffered an attack of measles or scarlet fever there are frequently signs of an encephalitis, and the ques-

tion arises whether or not it is due to some lesion in the cortex. When the symptoms of these diseases disappear the convulsive attacks disappear. In one case which I recall the convulsions continued to increase and the patient developed dementia—an instance of another type of functional activity. When the threshold is lowered by the presence of some substance in the body a progressive gliosis follows and this is an organic lesion which results in many of the cases in epilepsy.

In answer to the question as to whether these cases were due to organic lesions or to lesions resulting from hemorrhages, hydrocele and other conditions, it is observed that hemorrhages in some individuals which may involve the motor cortex produce no epilepsy or convulsions.

Experiments on animals have been made which prove that epileptic attacks may be produced by injecting substances such as urea or carbonate of ammonium into the blood and the amount injected is a very important factor in bringing about the convulsion. In a chart which shows the diseases due to hypo- and those due to hyperthyroidism we see that under the former are included cretinism and myxedema, while under the latter are conditions such as cyanosis, struma, etc. In discussing hyperthyroidism and hypothyroidism it is important to bring out the influence of the threshold of functional activity in bringing about certain conditions—conditions that are unquestionably due to some disturbance of the internal secretions.

DIETETIC TREATMENT OF CONVULSIONS AND ALLIED CONDITIONS  
OCCURRING IN INFANTS, WITH SPECIAL REFERENCE TO  
THE RÔLE PLAYED BY THE INORGANIC SALTS.

DR. CLIFFORD G. GRULEE, Chicago.—In 1905 Finkelstein noted that the irritating portion of the diet seemed to be in the whey of cow's milk. This finding I have confirmed. It is a general belief that calcium and magnesium salts act antagonistically to sodium and potassium, the former tending to allay, the latter to increase, nervous irritability. This relation may be expressed by the formula  $\frac{\text{Ca}}{\text{Na}}$ , or  $\frac{\text{Ca-Mg}}{\text{Na-K}}$ . The opposite of this proposition would also be true. Nervous irritability can be most accurately estimated by the electrical reaction. Hence it was determined to approach the subject of spasmophilia by endeavoring to pro-



duce increased electrical irritability by the use of sodium salts. Previous to doing this it was thought that a study of the metabolism of the inorganic salts in animals before and after thyroidectomy (thereby showing markedly the reaction of the electrical current) would be of interest. Twelve young dogs, preferably females, were chosen for this experiment. The food consisted of milk preserved with formalin, so that at no time did it show any decomposition. The animals were under observation for three days previous to the operation and for periods of two, three and four days afterward. The urine and feces were collected and careful analyses made. From these experiments we may draw the following conclusions:—

(1) In dogs in which there is hyperirritability of the nervous system, as shown by the increased electrical irritability, and as produced by the removal of the thyroid gland, there was no regular variation in the formula,  $\frac{\text{Ca}}{\text{Na}}$ , or  $\frac{\text{Ca-Mg}}{\text{Na-K}}$ , before and after operation, as shown by metabolic experiments. While in 3 dogs thus examined, there was apparently some support of the proposition that the quotient of this formula was increased during the period of hyperirritability of the nervous system; in the fourth dog no such reaction could be noticed.

(2) In the estimation of the salt content of the brains of 5 dogs, the first being a control, there was regularly found a decrease of the calcium content in the thyroidectomized animals. In one instance, however, the formula  $\frac{\text{Ca}}{\text{Na}}$  was less than that of the controlled animals.

(3) No variation in electrical irritability nor severity of the convulsive period could be demonstrated by intraperitoneal injections of normal sodium and calcium salts in the quantity of 40 to 45 c.c. of sodium salts and 2 to 4 c.c. of calcium salts in twenty-four hours.

(4) Even under normal conditions, when carefully estimated, the electrical irritability in dogs varies quite widely.

(5) While food containing whey is distinctly irritating to spasmophilic infants, the sodium and potassium salts corresponding in quantity to those contained in the whey do not regularly produce the increased electrical irritability which one would expect were the sodium to be regarded as the irritating substance in the whey.

DISCUSSION.

DR. L. EMMETT HOLT.—I wish to express my appreciation of the experimental work done by Dr. Grulee and of his clinical work in the dietetic treatment of convulsions and allied conditions occurring in early life. What we need now to clear up the problem is careful metabolic experiments upon infants suffering from these conditions. Dr. Grulee's experiments related to a single type of convulsions only, viz., those occurring in infancy and associated with spasmodophilia. These form but a small percentage of the cases of convulsions seen. In hospital practice single convulsions are matters of daily occurrence and are seen in a great variety of conditions, most of them not being significant or important. I think this is also true in private practice. It is interesting and significant in following up to later childhood patients who have had during infancy a number of attacks of convulsions to discover in how small a proportion of them epilepsy developed. Osler and Gowers have both emphasized the frequency with which epilepsy follows infantile convulsions. While it is no doubt true that a very large percentage of patients with epilepsy give a history of infantile convulsions, the number of children suffering from infantile convulsions who subsequently develop epilepsy is surprisingly small. Of 157 cases of convulsions occurring in infancy and early childhood in private practice, only 10 subsequently showed evidences of epilepsy. The importance of lumbar puncture in the diagnosing of convulsions was important and its performance should be insisted upon in every case of prolonged convulsions. Only by this means can one determine whether the case is one of meningitis or some other form of cerebral disease or whether the convulsions are due to some reflex cause. Lumbar puncture is of considerable value as a therapeutic agent, since in practically all of these cases there is a greatly increased pressure in the cerebrospinal fluid and the withdrawal of from one-half to one ounce often produces very marked and immediate improvement.

Convulsions rarely prove fatal *per se* unless associated with an enlarged thymus.

DR. HENRY DWIGHT CHAPIN.—There are convulsions and convulsions, and the kind that Dr. Holt has referred to occur frequently in hospital service but are only ephemeral in their effects. The important point that I wish to make is that in a

great number of cases of convulsions it is the ultimate result of prolonged convulsions that is feared. The ultimate result in some of these cases is epilepsy. In many of these cases the meningeal vessels of the cortex rupture and there is effusion and irritation which eventually produces a serious irritation of the brain, a condition which I have seen verified at autopsy in several cases.

The important point brought out was that every convulsion occurring in children should be treated seriously so far as the management was concerned. The child should be brought out of the convulsion at the earliest possible moment. Cases of prolonged convulsions should be considered with great care.

DR. LINNAEUS EDFORD LA FÉTRA.—Regarding the causation of convulsions and allied conditions, particularly cyanosis, it has been my experience that in young infants, leaving out of account meningitis and intracranial hemorrhage or the onset of acute affections, these conditions arise most frequently from four separate causes: (1) From prolonged pressure at the time of birth; (2) from gastrointestinal autointoxication; (3) from sepsis with or without brain lesion; (4) and from inanition.

The convulsions due to intracranial hemorrhage would appear shortly after birth in most instances, but in case the hemorrhages are very small they may not manifest themselves for several months. In 2 cases of convulsions from edema of the brain which I have seen and followed, the most striking physical sign was a tense bulging of the fontanel and a lack of pulsation. After four or five days the pulsation returned in the fontanel and the bulging disappeared. Coincidentally the convulsions ceased and the babies recovered.

In convulsions due to sepsis there is often an accompanying thrombosis or hemorrhage, and in these cases a bloody fluid is obtained by spinal puncture. One is led to suspect this condition when there is irregular respiration, the absence of pulsation in the fontanel, together with bulging and increased tension.

Premature babies and those too weak to nurse are subject to mild attacks of convulsions and cyanosis not connected with any brain lesion and in several such cases it has been found that giving the breast milk, which was not taken in sufficient quantities, by gavage or by means of the Breck feeder, was followed by a cessation of the attacks.

In my experience I have never seen convulsions which I have



attributed to teething alone; it is, however, unquestionable that many infants, particularly those of a neurotic heredity, are much more susceptible at the time of teething to gastrointestinal disturbances and to otitis media. It is very likely that this indigestion is at the onset a nervous disturbance of the secretion or a result of fever, which so frequently accompanies the eruption of a tooth. In such cases there is always evidence either in the stools or the ear that the convulsions are due to something more than the irritation of the gums.

A very unusual complication of convulsions occurred in a patient of mine some six years ago. The child had been subject to attacks of vomiting and convulsions with intestinal indigestion. At the end of a severe attack he suddenly began to vomit coffee ground fluid, having a fecal odor. He went into partial collapse and intestinal obstruction was suspected. The surgeon whom I called in made a diagnosis of acute dilatation of the stomach and gastric ileus. A stomach tube was passed and fully a quart of coffee ground feculent matter was evacuated. After lavage with hot saline solution the vomiting ceased and the danger was over. Unfortunately the boy had inhaled some of the vomited material and suffered an attack of pneumonia, then abscess of the lung and finally empyema. Although such a complication was exceedingly rare it suggested that the stomach tube should be at hand and ready for use, as well as the rectal tube for high irrigation.

DR. FOSTER KENNEDY.—One should not get into the habit of thinking or believing that infantile convulsions belonged to any definite clinical entity. In every case of convulsions one should have a clear idea in his mind not only as to what the etiology might be but, if possible, what brain area was affected. Lumbar puncture is very important in every case of convulsions accompanied by fever and one should resort to this procedure at once. One should determine at once whether the case was one of polioencephalitis, cerebrospinal meningitis or tuberculous meningitis. Diagnosis could thus be made precise with a one in three chance of cure. I wish to make a plea for the early and frequent use of the ophthalmoscope. I have seen many children blind through post-neurotic optic atrophy in whom there was a history of headache and convulsions with gradual subsequent loss of vision. These were undoubtedly cases of conglomerate tubercle with a tendency to cure. Had the exact cause of convulsions been



determined decompression could have been done, the sight preserved, and the natural progress of cure not interfered with. One must remember that hysteria is almost physiological with the child and it is difficult to state definitely whether the convulsions are the result of epilepsy or are hysterical in character. A point overlooked by most of the text-books is that if during the hour after the convulsive attack one gets a change in the type of the plantar reflex it is significant of the attack being of major epileptic nature. It seems to me right to give chloral or some other sedative to these children. I believe that convulsions allowed to go unchecked in infancy give rise to cortical instability and the epileptic habit in later life.

DR. CLIFFORD GRULEE, Chicago.—I wish it to be understood that the cases reported are purely spasmophilic in nature and represent but one type of convulsions. Spasmophilia is a very common condition and often accompanied by laryngismus stridulus.

The question regarding the etiology of epilepsy is a very peculiar one. Birk reported 50 cases of spasmophilia that were seen at the Breslau clinic. He followed these ten, twelve or fourteen years and in no case did epilepsy develop. He then took up true cases of epilepsy and followed them down and found that convulsions did occur in childhood but that they appeared in rather a peculiar manner, a single convulsion at intervals of a week, or a month, or even longer. But there were not the repeated convulsions that occur in spasmophilia proper.

THE TREATMENT OF ENURESIS: A NEW DEVICE.—Genouville is cited in the *Therapeutic Gazette* for August, 1912 (p. 478), as having reported to the Association Francaise d'Urologie an ingenious device for the treatment of nocturnal enuresis. Under the bed of the child there is placed, in the region where the nates repose, two metallic plates separated by a piece of flannel or absorbent cotton. These plates are connected with wires, one to each pole of a battery and bell. When the infant urinates, the cotton becomes wet, and the bell rings. The child wakes, and micturition stops. When this has happened several times the patient becomes cured. The device may be modified so that a slight electric shock is given to the abdomen of the child.—*Universal Medical Record*.

## THE PHILADELPHIA PEDIATRIC SOCIETY.

*October 3, 1912.*

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

## DIABETES.

DR. G. VICTOR JANVIER showed a girl of six years with diabetes, who had been observed at the Children's Dispensary of the University Hospital off and on for six months. The original diagnosis had been made at some hospital in New York in September, 1911. She gave the typical history of intense hunger, thirst, enuresis, nervousness, restlessness and languor. She was pale and much emaciated, her abdomen was distended and tense, with spleen just palpable. She weighed  $37\frac{1}{2}$  pounds. Upon small doses of Epsom salts and an attempt at a rigid diet her weight fell to 35 pounds. Examination of the urine showed 16 per cent. sugar, but no acetone or diacetic acid. Dr. Janvier emphasized the almost invariable hopelessness of juvenile diabetes, in spite of every measure. There is no hereditary taint or family idiosyncrasy. Diet is impossible, as the mother is most ignorant and unwilling and the home surroundings are hopeless.

DR. MAURICE OSTHEIMER referred to the impossibility of accomplishing anything with this child as a dispensary patient. In spite of advice, both of the physicians and social workers who visited her home, her mother made no effort to carry out directions. Her brother fell down stairs and fractured his spine last fall; her sister is well. Some improvement may be hoped for, now that this child has been admitted to the children's ward.

DR. A. A. ESHNER alluded to the etiology, saying that heredity and traumatism are the most important factors. He has always considered the prognosis the more unfavorable the earlier in life the disease appeared.

DR. R. S. MCCOMBS spoke of a family in which two children were affected by diabetes. One died at the age of seven years, and at the present time one aged five years is affected. There is a history of diabetes in the mother's family. Heredity seems to be a causative factor here.

DR. J. P. CROZER GRIFFITH said that in his experience these

cases have almost uniformly been unfavorable. He recalled only one favorable case in which sugar disappeared from the urine while the child, aged five years, was taking antipyrin. He believes diabetes to be probably more common in infancy than is realized. He spoke of a case of glycosuria in a baby of three months with an intracranial tumor. He also referred to a case in a baby of seventeen months, in which the condition was discovered accidentally, by the examination of the urine.

DR. JANVIER, in closing the discussion, emphasized the importance of routine examination of urine in children and also the importance of always differentiating between a diabetic glycosuria and true diabetes.

#### INTUSSUSCEPTION.

DR. W. ESTELL LEE showed a baby of six months who had been operated upon ten days before. Dr. Howard Childs Carpenter, who referred the baby to the surgical service of Dr. Edward B. Hodge at the Children's Hospital, gave the following history: He saw the baby September 26th. A healthy, breast-fed baby had been taken suddenly ill on the 23d, with vomiting, diarrhea, prostration and slight fever. From September 24th to the evening of the 25th the bowels had not moved, except for the passage of blood, and the child had vomited repeatedly and was greatly prostrated. During the night vomiting entirely stopped and the baby had two good-sized bowel movements of semi-liquid feces, without blood. As the baby did not look ill and abdominal examination was negative, diagnosis of spontaneous cure of intussusception was made. At six o'clock that evening all symptoms suddenly returned. The infant was greatly prostrated, vomited profusely and passed fresh blood from the rectum without feces, but with considerable tenesmus. Rectal examination was negative, but a tumor could be palpated in the right side of the abdomen, principally in the right upper quadrant. Diagnosis of recurring intussusception was made and the child sent to the Children's Hospital for operation. On admission the child was in remarkably good condition; fecal vomiting, bloody discharge from rectum and palpable tumor in the right upper abdominal quadrant were present. At the operation, at 9 P.M. the same day, the tumor was found to be an intussusception of the ascending colon, 3 inches long, with about



an inch of the appendix protruding from the neck of the intussusception. Slight traction by Dr. Hodge to the neck and pressure upon the apex easily reduced the intussusception. A suture was then passed through the base of the cecum and the parietal peritoneum of the right lower abdominal quadrant. The abdominal wound was closed with through and through silk-worm gut sutures and a continuous catgut fascial suture. Time, twelve minutes. Morphia was given immediately after operation; nothing by mouth for twelve hours, then albumen water and condensed milk. The third day the bowels were opened with an olive-oil enema, after which breast feeding was resumed. The baby has remained well since.

#### ABDOMINAL TUBERCULOSIS.

DR. HORACE J. WILLIAMS, by invitation, showed this child.

DR. LEE said that when he saw this child there had been complete intestinal obstruction, probably due to adhesions between the abdominal mass and the bowel, which was bent upon itself. These symptoms have wholly disappeared now.

#### ALOPECIA AREATA.

DR. MARIANNA TAYLOR showed an Italian child of five years. He was breast-fed, but had had convulsions at seven months, when teething. The family history is absolutely negative, except that a paternal uncle suffered from a similar condition, dating from trauma. Three years ago the boy fell, striking the back of his head, producing a scalp wound. His hair came out gradually, beginning at the margins, progressing steadily until absolutely none remained. He had already been treated with electricity and with stimulating applications before coming to us, with good results; but the condition always recurred after a few months. His scalp was bald and glazed, eyebrows lacking, but eyelashes present. General physical condition was good. A stimulating lotion containing cantharides and capsicum was prescribed and later a crysarobin ointment, gr. xx. to the ounce. The hair is returning slowly under this treatment. The case is apparently trophoneurotic in type, the loss of hair having begun at the margins, not in patches as is nearly always the case.

DR. LE BOUTILLIER said that this boy clearly shows the large areas of denudation to be found in such cases; in fact, these



areas coalesce. But the hair is now reappearing all over his scalp. This is the fourth attack. Complete recovery seems hardly possible.

DR. ESHNER thought, on account of the extensive distribution of the disorder, that the case could with propriety scarcely be designated one of alopecia areata.

DR. LE BOUTILLIER added that the areas appeared to have spread out from the former scars.

DR. GRIFFITH asked whether the case was considered to be due to the injury or traceable rather to a neurotic family history.

DR. TAYLOR replied that the case was believed to be tropho-neurotic and that the family history was remarkably good.

#### GASTROENTERITIS WITH INTERESTING COMPLICATIONS.

DR. JOHN F. SINCLAIR reported this case, showing clinical and weight charts. The girl, aged three months, was admitted to the Babies' Hospital July 15th, with a diagnosis of ileocolitis. She had always been difficult to feed, was undeveloped and had been having loose, green stools, with curds and mucus, for five weeks. Fever had been noted. At the age of five months she had had pertussis. Various milk formulæ and condensed milk had been tried with indifferent results. Vomiting had been a prominent symptom from the first. During her two months in the hospital she developed cellulitis of the scalp, lobular pneumonia and vaginitis. She showed a marked tendency to subnormal temperature. There were 13 recorded rectal temperatures below 96°F. Four were between 95° and 96° F.; four between 94° and 95° F.; two between 92° and 93° F., and on three occasions the temperature was not recorded on thermometers which would record temperatures as low as 92°F. Accompanying these periods of subnormal temperature the weight chart showed marked losses. The baby took its food poorly and did not even properly assimilate what was taken. Prostration was marked and the infant appeared to be in a moribund condition. The treatment consisted of efforts to maintain body heat by every means available, appropriate stimulation and alimentation per rectum as well as by mouth. The ileocolitis was combatted by an initial dose of castor oil, followed by colon irrigations. Cellulitis of the scalp was treated by incisions and

through and through drainage. Lobular pneumonia was combatted with mustard paste to the chest and stimulation. Vaginitis was treated by douching with potassium permanganate. Feeding was begun with a 3-6-1 mixture on the second day. Raised to a 3-6-1.5 two days later. To this soy-bean gruel was added as the diluent after three days. On the sixteenth day a 3-6-2 mixture was attempted, but was not well borne. Casein milk was then employed, beginning with 3 ounces every three hours, raising the quantity gradually to 8 ounces every three hours. Eighteen days were required to accomplish this. On the 25th day 1 ounce of 20 per cent. cream was added to the twenty-four-hour quantity of casein milk. In twelve days this was gradually raised to 2½ ounces of cream. In all, casein milk was used for forty days. After that half milk was employed and the baby went home on a mixture of  $\frac{2}{3}$  milk and  $\frac{1}{3}$  water. The weight on discharge was practically the same as on admission. The baby is doing well at present and continues to gain in weight.

DR. LE BOUTILLIER said that many infants ran subnormal temperatures—94° or 95° F.—this summer at the Babies' Hospital, when the malnutrition was very marked and the infant taking very little food, with almost total lack of assimilation.

DR. ESCHNER suggested that probably the temperature was lowest when assimilation was at its lowest; that it was not so much a matter of nutrition as of chemical and digestive activity.

DR. SINCLAIR added that, while the pulse was weak and very feeble at times, it never went above 136; the baby, however, appeared to be dying when the temperature fell so low. These low temperatures always accompanied the greatest malnutrition.

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NAIL BITING.—As a remedy for nail biting, Schreiber strongly recommends the use of chewing-gum, as giving children something to masticate. He advises the child to chew a piece of the gum whenever he feels compelled to bite the nails. The results have been immediate, to the surprise of both the patients and their parents. This is, it is true, only changing one "tic" for another, but it may be said that mastication acts beneficially on digestion, whilst nail biting has absolutely no advantages.—*Universal Medical Record*.

## CURRENT LITERATURE.

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ABSTRACTS IN THIS NUMBER BY

DR. CHARLES E. FARR. DR. C. D. MARTINETTI.

DR. J. F. SAMMIS.

### SURGERY.

BRUN, V.: ADVANTAGES OF SUBCUTANEOUS ELASTIC LIGATURE IN TREATMENT OF UMBILICAL HERNIA IN CHILDREN. (*Archiv. de Méd. des Enf.*, Paris, September, 1912.)

Brun states that Nota, of Turin, has used the elastic ligature method since 1890 in 244 children. An elastic cord, thirty or forty cm. long is passed around the base of the hernia beneath the skin by means of a long curved needle. The hernia is then reduced and held in place by the finger while the elastic cord is drawn tight enough to obliterate the opening. The ends of the cord are then tied with silk close to the skin and cut off. The rubber cord cuts through the soft tissues in its grasp, and the space is filled in with scar tissue completely closing the hernial ring. At the end of twelve or fifteen days when the entire cord comes out from the tiny opening in the skin, a thick solid scar is left behind. The dressings are not changed for ten days, at the end of which time a new dry dressing is applied and the child should wear a cloth binder for two or three months. No complications of any kind resulted but there was one recurrence in a young infant with a very large hernia, due to an attack of coughing. This case was also cured by the same operation six months later. In infants no anesthesia is required, but Nota uses ethyl chloride for the older children. The operation is a very short one and the children are allowed to be taken home at once.

CHARLES E. FARR.

FRAZER, J.: RELATIVE PREVALENCE OF HUMAN AND BOVINE TYPES OF TUBERCLE BACILLI IN BONE AND JOINT TUBERCULOSIS IN CHILDREN. (*Journal of Experimental Medicine*, October, 1912.)

Frazer's most important contribution to our knowledge is the fact that a high percentage of the cases of bone and joint tuberculosis is bovine in origin. In nearly all the cases the germs were



introduced into the system by drinking cow's milk. Where the human bacillus was present, however, there was a definite history of pulmonary tuberculosis in the family in a large proportion of the cases, and the infection was probably direct from parent to child. Seventy cases were studied, all under twelve years of age, with three exceptions, the material being obtained by operation. Thirty-nine were joint cases, while 31 were in bone. The bovine bacillus was found in 41 cases, the human in 26, and both types were found in 3. Frazer has no doubt that cow's milk was the medium of infection in the bovine cases. A number of the children were less than one year old, each had been fed entirely on cow's milk, and in each the bovine bacillus was found. In the group from one to two years of age, two-thirds were of the bovine type and each of these had been entirely fed on cow's milk from birth. In none of the cases had there been any effort made to obtain pure milk or to sterilize that which was used.

CHARLES E. FARR.

SAMPSON, H. H.: OPERATIVE TREATMENT (LANE) OF SIMPLE FRACTURE OF LONG BONES IN CHILDREN. (*Lancet*, London, August 17, 1912.)

Of simple fracture of the long bones, 46 cases have been recently examined by Sampson. Of these, 42 had been operated upon, and of the recent cases, 34 in number, 30 gave perfect anatomic and functional results, 3 were perfect functionally, but not anatomically, while 1 was both functionally and anatomically imperfect. Of the 7 cases of mal-union operated upon, 3 gave perfect results, 1 was imperfect anatomically, but with perfect function, while 3 were imperfect both functionally and anatomically. Of the imperfect cases, 4 were so slight as not to interfere with function. Sampson argues from these results for early routine operations, as the results are so much better when operation is undertaken early. Sixty patients have been "plated," and of these 35 have been examined. Of the 31 recent cases, 27 show perfect results, 3 show perfect function, while 1 has a slight loss of function and is classed as imperfect. Of the 3 mal-united cases, 2 gave a perfect result and the third a perfect functional result. One case of non-union gave a very bad result, as no plates could be used. A number of other minor mishaps occurred without serious consequences. The plates



undergo oxidation, but there is no corrosion, and no rarefying osteitis has been seen. Slight lengthening of the operated side has been frequently observed. CHARLES E. FARR.

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### MEDICINE.

PEABODY, DRAPER AND DOCHEZ: A CLINICAL STUDY OF ACUTE POLIOMYELITIS. New York, Rockefeller Institute for Medical Research, 1912. Monograph of the Rockefeller Institute for Medical Research, No. 4, June 1, 1912.

Poliomyelitis is a general infection, the virus obtaining entrance through the lymphatics following the olfactory nerve. It is human borne and may be carried by active or passive carriers. It may be attached to bedding, to pets and insects, ground into dust and conceivably be disseminated by the wind.

The normal sera of humans protected four of six monkeys and the sera of humans suffering from the disease protected animals in each instance. The first lesion is a cellular exudate in the perivascular lymph spaces of the leptomeninges. The cellular exudate forms a sheath apparently completely surrounding the vessels for long stretches; in many places forming thick collars which serve to press on the lumen of the vessels and exert a mechanical effect in obstructing the circulation. There is also a toxic effect of the virus as evidenced by hemorrhages large and small and by extensive edema. These three factors—cellular exudate, hemorrhage and edema are the primary reaction of the nervous system to the virus. These factors probably cause anemia of the cord and the rapidity of their absorption determines the ultimate outcome. The most marked lesions are found on the anterior surface of the cord in both the white and gray matter—also in the brain, medulla and pores. Constant changes are also present in the posterior root ganglion the same as those in the cord itself. Lymphoid tissue and parenchymatous organs throughout the body seem to react to the virus.

The authors classify the cases in three groups: (1) abortive; (2) cerebral—upper motor neurone involved—spastic paralysis; (3) Bulbo spinal—lower motor neurone and flaccid paralysis.

The predisposing causes are: (1) Season cases occur during the summer and reaching height in early autumn; (2) more in

open country than in cities; (3) age, one to three, although may occur at any age. Prodromal stage is important for proper quarantine and therapy. Symptoms of this stage may last one to seven days, and their severity has no relation to the extent of the ensuing paralysis in the severity of the disease. The most important symptoms are: (1) fever up to  $103^{\circ}$  F.; (2) drowsiness; (3) irritability; (4) hyperesthesia of the skin; (5) pain particularly by those movements which cause anterior flexion of the spine; (6) stiffness of neck; (7) pain in head, back and legs; (8) weakness of one or more groups of muscles; (9) respiratory symptoms; (10) gastric symptoms, loss of appetite, nausea and vomiting—not projectile as in meningitis.

The blood findings were in no way conclusive. The spinal fluid showed increase in pressure in number of cells and of globulin content. The correlation of the spinal findings with the clinical picture may clear the field and permit of a diagnosis in the prodromal stage. Any of the following symptoms may occur during the acute stage. (Between the onset of the paralysis and the disappearance of tenderness on spinal flexion.) (1) Photophobia; (2) opisthotonus; (3) enlargement of superficial glands; (4) rigidity of the posterior muscles of the neck; (5) knee jerk on unaffected side is more often present; (6) retention of urine; (7) constipation is usually present; (8) pain; (*a*) spontaneous; (*b*) by manipulation; (*c*) along the nerve trunks; (9) fever not high more than four days; (10) deep stupor.

Paralysis often very irregular. The lumbar and cervical parts of the cord most commonly affected due to the larger blood supply. All cases that die without complications die of respiratory failure which means paralysis of the intercostal muscles and of the diaphragm. During this stage a constant leukocytosis was present, an increase in the polynuclears and a diminution of the lymphocytes. The cerebrospinal fluid in the early days of the illness shows an increased cell count with a low or normal globulin content. The polynuclear cells may amount to 90 per cent., although more commonly the fluids show lymphocytes and large mononuclear cells.

All fluids examined reduced Fehling's solution, about 16.5 per cent. die; adults more commonly than children. Death most common from the third to seventh day. Patients are considered out of danger on the ninth day following the first appearance of muscular weakness.

Factors in determining the prognosis are a peculiarly alert cerebration and paralysis of the thoracic muscles or diaphragm on account of the danger of pneumonia. The following therapeutic measures are suggested. Strict quarantine, urotropin usually given over a period of a week. Hydrogen peroxide for short periods in nose and throat. The rest of the treatment is symptomatic and to prevent deformities. J. F. SAMMIS.

UNGER, L.: MELENA NEONATORUM. (*Wien. Klin. Woch.*, September 26, 1912.)

Unger has had 9 cases of this usually fatal affection, with but one death. The loss of blood was very great, and yet one infant recovered without the use of any medication whatever. The quickest and best cures were brought about by the use of 2 c.c. of the mother's blood serum, administered hypodermically. Gelatin was tried in every way but without apparent effect, although, with one exception, the infants recovered. In one successful case horse serum was injected after the repeated use of gelatin, while in another, gelatin and calcium chlorid were employed. In the one fatal case gelatin and ergot by mouth were used.

CHARLES E. FARR.

COMBY, F.: TENIA IN AN INFANT. (*Arch. de Méd. de Enf.*, 1911, No. 7.)

A child of nine months with pronounced anemia was being nourished with a daily allowance of raw beef juice. Very soon fragments of tenia began to appear in the stools. Comby ordered the beef juice discontinued and administered 50 centig. of extract of male fern in syrup. The patient passed a very large number of sections but no head. Two months later the head was expelled after taking a decoction of fresh pumpkin seeds.

C. D. MARTINETTI.

FIGORE, G.: CRANIAL PERCUSSION IN INFANTS. (*Riv. di Clin. Ped.*, January, 1912.)

Some years ago cranial percussion was considered a valuable diagnostic aid in pediatric practice. It was subsequently almost forgotten and only recently has any work been done in this line. Fiore has accurately studied 42 cases of tubercular meningitis, encephalitis and cerebral tumors, finding that increased in-

tracranial pressure invariably produces a metallic resonance, especially in the temporo-parietal regions. C. D. MARTINETTI.

GERHARTY, H.: DIPHTHERIA AND X-RAYS. (*Berlin. Klin. Woch.*, 1909, No. 46.)

The author in the laboratories annexed to Senator's clinic treated a series of rabbits in two different ways. Part had diphtheric toxin injected after it had been exposed to the X-rays, part were themselves exposed to the rays after the injection. The results showed beyond doubt that the X-rays greatly diminish the toxicity of diphtheric bacilli both in vitro and in circulation.

C. D. MARTINETTI.

VAUNINI, F. D.: ARTERIAL PRESSURE IN SCARLATINA. (*Bull. Sc. Méd.*, 1911, No. 12.)

The arterial pressure in scarlatina infection has no characteristic course. In the first days of the disease pressure increases, together with rise of temperature, rate of pulsations and breathing. As convalescence approaches pressure once more decreased to normal.

C. D. MARTINETTI.

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### THERAPEUTICS.

ROEDER, H.: ADMINISTRATION OF IRON IN CHILDREN. (*Archiv. für Kinderhk.*, No. 56.)

Roeder has been giving in anemia with excellent results an iron preparation (presumably proprietary) called ferroglydin. Experimenting with the same upon rabbits he has found, following its administration, a notable increase of iron in the liver, thus demonstrating a regular storage process of the drug in the system.

C. D. MARTINETTI.

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### INFANT FEEDING.

ALLARIA, G. B.: ON THE AMOUNT OF SALIVA SECRETED BY INFANTS WHILST NURSING. (*Riv. di Clin. Ped.*, June, 1912.)

The author by means of rather complex calculations has succeeded in determining the osmotic concentration of the food, that of the saliva, and that of the liquid bolus ready to be swallowed.



These data together with the quantity of food ingested allow him to determine the relative proportions of saliva and food in the bolus itself and consequently the quantity of the saliva.

Accurate clinical researches show that the quantity of saliva ranges between 1-10 and 1-5 of the total.

C. D. MARTINETTI.

ROTT: THE NOURISHMENT OF PREMATURE INFANTS. (*Gets. für Kinderhk.*, September 25, 1912, p. 134.)

Rott's cases were observed in Langstein's clinic at the Kaiserin Augusta Victoria Haus in Berlin. Incubators are no longer used there; the infants are kept warm by means of hot water appliances placed around the bed. These contrivances are used until the infants weigh 2,000 grams. They are then placed in a so-called warm room which falls south and which is well ventilated.

Forty-nine cases were treated in one year. The weight of these infants varied between 950 and 2,270 grams; 11, or 22.47%, of these cases died. They were all fed with breast milk. If the infants were too weak to suckle they were fed by means of a stomach tube. Rott shows conclusively that the stomach tube (catheter) is an excellent device for feeding weak premature infants; 18 cases were fed by this method and only 2 of these cases died.

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#### MISCELLANEOUS.

RIVA-ROCCI, S.: ON THE POWER OF SUCTION IN INFANTS. (*Riv. di Clin. Ped.*, November, 1911.)

Riva-Rocci, of Sphygmomanometer fame, has been endeavoring to get an accurate knowledge of the power exerted at suction by infants while nursing. By means of a simple instrument of his own devising he has found that the suction produced by a newly born child averages normally between 1 and 3 cm. of Hg., increasing until at eight months about 8 cm. is reached. As practically all pathological conditions impair the power of suction the author suggests that possibly in the future such measurements will attain some importance as a diagnostic aid.

C. D. MARTINETTI.

## BOOK REVIEW.

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LES VERS-INTESTINAUX DANS LA PÂTHOLOGIE INFANTILE. By GEORGES RAILLIET, Ancien Interne Des Hospitaux de Paris. Ancien Moniteur A La Clinique D'Accouchment De La Faculté (Clinique Tarnier). Paris: Asselin et Houzeau, 1912.

This volume of 241 pages is based on a careful review of the literature and a statistical and clinical study made by the writer at the Saint Louis and Enfants-Malades. The cestode parasites considered are *Tenia solium*, *Tenia saginata*, *Hymenolepis nana*, *Hymenolepis diminuta*, *Drepanidatania lanceolata*, *Dipilidium caninum*, *Davaenea madagascarensis* and *Bothrocephalus latum*. Under the trematodes, *Ascaris lumbricoides*, *Oxyuris vermicularis*, *Trichocephalus trichiuris* and *Ankylostoma duodenale* are treated in detail.

The chapters devoted to symptomatology are of special interest and this part of the subject is treated in a very conservative way. While the author considers doubtful many of the graver disturbances which have been attributed to the presence of intestinal worms, yet his analysis of reported cases and his own observations, show that a number of pronounced disturbances are of such origin. It is unnecessary to describe the symptoms in detail, but among the more prominent are anæmia, convulsions, fever, gastric disturbances, enteritis (*T. trichiuris*), night terrors, pruritis, etc. A very complete and interesting chapter is that which describes the symptoms due to the migrations of ascarides—intestinal perforation, fistulas, etc.

The frequent occurrence of oxyurides in the appendix of children has caused considerable discussion as to what degree their presence may be the determining cause of an acute inflammatory process. In some instances the presence of the parasites has been considered the exciting cause of appendicitis, in others a predisposing cause. On the other hand, some writers doubt any causal relationship, as oxyurides have been found in the appendix of many individuals without causing any apparent inflammatory reaction. Dr. Railliet believes that the presence of oxyurides may be a cause of appendicitis; to what degree, however, is difficult to determine, but he considers that in all cases they are a possible cause of aggravation and persistence of the lesions.

The treatments advised for the different helminths do not differ from those usually prescribed, but the writer has compiled a number of different formulas which may be of service. He has justly emphasized the necessity of persistent treatment to expel the threadworm. Both internal medication and irrigations are advised. Santonin is given two days a week for a month, then for every five days for a month or two. The treatment must be continued for several months and perhaps repeated a number of times during a year; even then there may be recurrences. The concluding chapters are given to case records and bibliography, both of which are complete.

On the whole, Dr. Railliet's book gives a complete description of the frequency, symptomatology, pathology and treatment of intestinal parasites in children, and should prove a valuable reference work to any one interested in the subject.

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### BOOKS RECEIVED.

NEURASTHENIA SEXUALIS. By BERNARD S. TALMEY, M.D.  
New York: The Practitioner's Publishing Company, 1912.

NEW ASPECTS OF DIABETES. By PROF. DR. CARL VON NOORDEN,  
Professor of First Medical Clinic, Vienna. Lectures delivered at the New York Post-Graduate Medical School and published by their authority. New York: E. B. Treat & Co., 1912.

COLLECTED STUDIES FROM THE RESEARCH LABORATORY DEPARTMENT OF HEALTH, CITY OF NEW YORK, William H. Park, M.D., Director. Vol. VI., 1912.

DISEASES OF CHILDREN: A PRACTICAL TREATISE ON DIAGNOSIS AND TREATMENT FOR THE USE OF STUDENTS AND PRACTITIONERS OF MEDICINE. By BENJAMIN KNOX RACHFORD, Professor of Diseases of Children, Ohio-Miami Medical College, Department of Medicine of the University of Cincinnati; Pediatrician to the Cincinnati Hospital, Good Samaritan Hospital and Jewish Hospital. New York and London: D. Appleton & Co., 1912.

STUDIES IN CLINICAL MEDICINE. By C. O. HAWTHORNE, M.D., Fellow of the Royal Faculty of Physicians and Surgeons of Glasgow. London: John Bale, Sons & Danielsson, Ltd., 1912.

# ARCHIVES OF PEDIATRICS

DECEMBER, 1912.

ROYAL STORRS HAYNES, PH.B. M.D.,  
EDITOR.

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## EDITORIAL.

### THE HEALTH OFFICER AND INFANT MORTALITY.

The problem of infant mortality is great enough and grave enough to demand the earnest attention of the health officer. Professor Wilcox, in his study of the vital statistics of this state, said that "there are three cities in which more than one-fifth of the children born die during the first year, and there is one city in which more than one-half die in the first year, a condition perhaps without a parallel in any other city, American or European, and one calling for immediate correction by the coöperation of the local health officers." Competent observers and students on this subject have shown that at least one-half of the deaths of infants are preventable and this startling and appalling fact demands our serious consideration.

Never in the history of the world, certainly not in modern times, has so much intelligent and earnest effort been directed to the care and welfare of children as to-day and "Save the



Baby" has become a popular slogan. The health officer is the appointed guardian of the health of the people in his community. All efforts along this line should be inaugurated, or, at least, directed, by him.

The registration of births in this state is shamefully neglected. Dr. Cressy L. Wilbur says that "nothing can be done in preventing infant mortality until we know where the babies are and when they arrive," and that "this is the key to the situation so far as the vital statistics side is concerned." He further refers to the fact that many cities in the United States register only 20 per cent. of their births. The experience in Rochester is of interest in this connection. In 1910 the health officer required the sanitary inspectors whenever they inspected a house to ask if there were any children in it under two years of age. If so, they were reported to the registrar of vital statistics to see if the birth had been recorded. The school nurses and milk station nurses gathered similar statistics, so that the number of births in 1910 was over 20 per cent. more than in 1909. Names were also taken from the baptismal records in the churches and compared with the official records, and it was found that 20 per cent. of these were previously unrecorded.

The law in this state is direct and forceful on birth registration, and the health officer fails to perform his duty if he does not see that its provisions are fully and carefully carried out. Attorney General Carmody recently rendered a decision to the effect that if any physician fails promptly to report births or deaths to the proper authorities his license to practice may be taken away. Our own Department of Health is making a vigorous effort for a more complete registration of births. Physicians and midwives should file certificates within thirty-six hours after birth, but if unable to do so a special report upon a notification card must be made within that limit. A system of prompt notification thoroughly enforced will aid in the completeness of registration. Dr. Eugene H. Porter, Commissioner of Health, in a circular under date of July 10, 1909, states that "the time for leniency has passed and personal feelings on the part of physicians or those whose duty it is to see that the laws are obeyed must be set aside. It may as well be known now that the law must be obeyed and that proper steps for its enforcement will be taken hereafter as violations of the law occur."

I wish to call your attention to the following resolution re-

cently adopted by the American Association for the Study and Prevention of Infant Mortality:—

“WHEREAS, the registration of *all* births and of *all* deaths is most essential for the study of infantile mortality and the prevention of the deaths of infants and children from avoidable causes, therefore, be it

“*Resolved*: That the American Association for Study and Prevention of Infant Mortality cordially approves of the model law for the registration of births and deaths, as recommended by the American Medical Association, the American Public Health Association, and the United States Bureau of the Census, and urges the thorough *enforcement* of such laws by the officials charged with the responsibility of their execution, with prosecution of physicians and midwives who neglect their duties to their clients and to the public health by failing or neglecting to register births as required by law.”

The health officer could have a map prepared of his community on which the location of each death of a child under five years is located. This would at a glance reveal graphically and convincingly the dark spots of infant mortality in his territory. He could then make a personal investigation of the sanitary conditions and surroundings of these afflicted homes and remedy defects so that the location becomes more healthful and livable.

Gastrointestinal disorders claim the largest number of victims among infants, and perhaps the largest single factor in their production is impure milk. For this reason the health officer should study with great care the dairy conditions and the milk distributing agencies in the locality over which he has charge. The State Department of Agriculture would willingly coöperate in inspecting and scoring the dairies but the problem of the milk peddler and the education of the housekeeper on the care of milk in the homes are a part of the duties and responsibilities of the health officer. The city, town and village authorities should provide the three vital essentials for the baby—fresh air, pure water, and clean milk, and the people look to the health officer as their representative in securing these necessities.

Ignorance—not indifference—on the part of the mother is the cause of much needless sacrifice of life. The average mother hungers after knowledge and her appetite should be appeased. She is the natural custodian of her child and efforts should be made to educate her in the first principles of baby hygiene. The

health officer has not the time or opportunity to do this, even if he has the inclination. He can, however, see that this is done by proxy. A visiting nurse attached to his staff would literally perform miracles and would be the direct means of saving many infant lives.

The average cost of a baby's funeral and sickness has been estimated at \$50, so that it does not require a very close calculation to say that her employment would be a profitable investment. In 1911 there were 383 deaths under one year of age in Syracuse. It costs the people of Syracuse nearly \$20,000 to bury these babies. If 100 could have been prevented, which is a conservative estimate, it would mean a saving of \$5,000, and Syracuse would have 100 more babies, and there would be happiness instead of sorrow in 100 more homes.

A nurse should visit the home of every baby whose birth is reported to see if her services and advice were needed. This, of course, applies to the families of the poor, where a trained nurse is not employed. The health officer of Syracuse inaugurated a system of visiting newborn babies last summer during the months of July and August. He employed the school nurses, who otherwise would have had nothing to do, and they visited 165 new babies. In a number of these cases the nurse made six to ten visits and assisted the mother in bathing the baby and giving general instructions, and in one case her persistent efforts saved the eyesight of a baby that was suffering from ophthalmia neonatorum. None of these babies died while under observation of the nurse. Dr. Palmer, under whose direction this work was carried on, states in his report that "the work has proved of great benefit, both in an educational way to the parents in matters of hygiene and in addition there has been accomplished a great deal of good in caring for the infants themselves."

In an address before the women of the Grange at the State Fair here in Syracuse last September, I advocated the employment of rural visiting nurses. There are a number of agencies at work in our cities to improve the condition of the poor and to care for them when sick, which results in saving many lives, but little or nothing is being done along these lines in the country districts. That there is an urgent need for such work in the country is shown by the fact that the rural death rate in New York State is greater than the urban. The employment of nurses can be easily secured in the larger cities, but it is more difficult



to obtain a nurse for this work in the small villages and rural communities. District nursing has been established on a national basis in Australia so that the services of the nurse reach the poorest and most remote sections of the country. Canada has established a chain of small hospitals from Vancouver to Labrador, which serve as centers for each nurse whose work radiates from these points. There are a few scattered rural nursing associations in the United States and but one in New York State. This is in Westchester County, where several small villages united in supporting visiting nurses on a coöperative basis. The nurse receives from ten to fifty cents a call, according to the circumstances of the family. The American Red Cross has recently decided to undertake the organization of a rural nursing service, and a special committee has been appointed to work out a definite policy. This committee has not yet made its report, but it seems probable that the Red Cross will undertake the selection of nurses for rural communities who have had training in visiting work and will recommend them for positions and maintain some supervision over them.

The State Department of Agriculture is very kind to the farmer. It sends experts to examine his soil and advise the kind of crops to be sown and the rotation to be followed. Should his hogs die from some unknown cause, a thorough study and investigation is made. Cow testing associations are being arranged and supervised by the department in order to improve the stock and prescribe scientific and balanced rations. The baby should be and is the most important item of live stock on the farm and the State Department of Health should be able to do as much for the babies as is being done for the cows.

Professor Winslow recently said that "the visiting nurse is the most important figure in the modern movement for protecting baby health," and I believe that an organized system of visiting nurses should be established in this state. The State Department of Health could very properly establish a Division on District Nursing, which would not only be far-reaching in its usefulness and of great assistance to the doctors, but would become a large factor in lowering both the infant mortality and the large death rate among our rural population.\*

HENRY L. K. SHAW.

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\* Read at the Twelfth Annual Conference of the Sanitary Officers of the State of New York, held at Syracuse, N. Y., December 4, 5 and 6, 1912.



## THE HISTORICAL NOTES.

We are glad to be able to present as a part of this number which is devoted to a most successful meeting of four pediatric societies, an account of each society written by men who are familiar with the work and the management of these societies and have watched them grow with the growth of the acceptance of pediatrics as a specialty. Apparently there is needed for the successful solution of the problem of how to have good meetings the formula: good officers plus hard work plus an interested membership plus a restricted freedom of speech (or prevention of logorrhea). Each seems an essential for the solving of the problem.

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## MEDICAL SOCIETY OF THE STATE OF NEW YORK.

## COMMITTEE ON PRIZE ESSAYS.

*Announcement.*

The committee in charge of the Merritt H. Cash \$100 and Lucian Howe \$100 Prize Fund of the Medical Society of the State of New York, offers the suggestive, but not arbitrary, subjects upon which the competitors may write their essays:

1. Diagnosis and treatment of syphilis of the central nervous system.
2. The present status of serum therapy.
3. Latest research relative to cancer.
4. The order and sequence of vascular and cardiac disease.
5. The function of the State in limiting the increase of imbeciles and degenerates.
6. Surgery in functional and organic disorders of the stomach.

The essays must be in the hands of the chairman of the committee, Dr. Albert Vander Veer, 28 Eagle Street, Albany, N. Y., not later than April 1, 1913.

DR. JOHN F. W. WHITBECK,

781 Park Avenue, Rochester, N. Y.

DR. EDWARD D. FISHER,

46 East Fifty-second Street, New York.

DR. ALBERT VANDER VEER,

28 Eagle Street, Albany, N. Y.

*Committee.*

## THE TREATMENT OF HEMORRHAGIC DISEASE OF THE NEWBORN.\*

BY BETH VINCENT, M.D.,

Surgeon to the Infant's Hospital: Surgeon to Out-Patients, Massachusetts General Hospital: Assistant in Surgery, Harvard Medical School, Boston.

In past years little progress has been made with the problems of the etiology and treatment of hemorrhagic disease of the newborn. We have still much to learn about the cause of the disease, but the recent use of serum therapy in this condition seems to have marked a distinct advance in the treatment. This new treatment has been applied in the form of blood transfusion and by the subcutaneous injection of animal serum, human serum and whole human blood. While the number of reported cases is not large, the results show such a high percentage of recoveries as to justify the assumption that the use of blood or its derivatives by these various methods is of therapeutic value in this disease.

*Mortality.*—When treated by the older methods hemorrhagic disease of the newborn is characterized by a very high mortality. According to Holt, no observer has seen more than one-third of his cases recover. Schloss and Commiskey,<sup>1</sup> in their excellent article on "Spontaneous Hemorrhage in the Newborn," state that the mortality in this condition ranges from 35 to 87 per cent. Vassmer,<sup>2</sup> in 1909, collected 67 cases with a mortality of 32.8 per cent. Shukowsky<sup>3</sup> experienced a mortality of 62 per cent. in 29 of his own cases. For all forms of the disease, probably 60 per cent. represents the average mortality. Some cases recover without treatment. This may account for the cures which have been reported in isolated cases with the use of various therapeutic agents, such as calcium chloride, adrenalin, the iron preparations and gelatin. Notwithstanding these successful cases the consensus of opinion seems to be that these measures have little therapeutic value in this condition.

An exception to this statement, however, must be made in regard to gelatin, which has been widely used in Europe and is highly recommended by some German writers. Vassmer's<sup>2</sup> 67 collected cases of melena neonatorum, with a mortality of 32.8 per cent., included 34 cases which were treated with gelatin, with a fatal result in only 3 cases, a mortality of 8.8 per cent. Holz-

\* Read at a Joint Meeting of the Philadelphia Pediatric Society, New England Pediatric Society, Section on Pediatrics of the New York Academy of Medicine and the New Jersey Pediatric Society, held in Philadelphia, November 12, 1912.

schmidt,<sup>4</sup> who reported 14 cases with a mortality of 50 per cent., subsequently treated 5 cases in one year with gelatin and had no deaths. Shukowsky,<sup>5</sup> on the other hand, employed gelatin in some of his 29 cases and came to the conclusion that it is practically without effect in melena, and states that Fischer has made the same observation. Unger<sup>5</sup> reports 9 cases of melena neonatorum with a single death. One case recovered without treatment. The other 8 cases received gelatin subcutaneously and by mouth and rectum. In some of the cases the gelatin was supplemented by ergotin, calcium chloride and horse and human serum.

#### SERUM TREATMENT.

*Animal Serum.*—The use of serum in the treatment of hemorrhagic disease of the newborn was suggested by the work of Weil<sup>6</sup> on serotherapy and hemophilia. Animal serum was first employed for this purpose in hemorrhagic disease, but only a few cases have been fully reported.

Leary<sup>7</sup> used fresh rabbit's serum in 7.5 and 15 c.c. doses; he was successful in 2 cases and failed in a third. Bigelow<sup>8</sup> reports three typical cases of profuse bleeding, which were cured in one instance by two injections of 5 c.c. of fresh rabbit's serum and in the other cases by a single injection of 5 c.c. of the serum. Schwartz and Ottenberg<sup>9</sup> gave 10 c.c. of horse's serum to an infant which had no effect on the hemorrhage, which was subsequently checked by transfusion. In another case (Swain, Jackson and Murphy<sup>10</sup>) 75 c.c. of rabbit's serum failed to check a profuse gastrointestinal hemorrhage which transfusion stopped at once.

*Human Blood Serum.*—The attention of the profession was first called to the use of human blood serum in hemorrhagic disease by the work of Welch,<sup>11</sup> who began this treatment in January, 1909. He reported 12 cases in 1910, which were all cured by the subcutaneous injection of human serum.

In a more recent article, "Normal Human Serum in Obstetric and Pediatric Practice," Welch<sup>12</sup> refers to his experience with this treatment in 32 cases of hemorrhagic condition. Only a few cases were reported in detail. The writer does not state definitely that all were cured, but he concluded from his experience that the serum is a specific for these pathologic hemorrhages. Richards<sup>13</sup> also reports a successful case with the serum treatment. Nicholson<sup>14</sup> refers to his experience with about a dozen cases of hemorrhagic disease, all of which died with the exception of the



last one, which he treated with human serum. Three of Unger's<sup>5</sup> cases were given 2 c.c. of the mother's serum after gelatin had failed to stop the bleeding in 2 of them.

Welch collects the blood by means of an apparatus which consists of a suction flask and a needle for tapping a large vein at the elbow. The dose of the serum depends upon the urgency of the case. He states that it is advisable to begin with 10 c.c., repeated three times a day if the bleeding is moderate. In severe cases the serum should be given every two hours, in larger quantities if necessary. It is important to begin the treatment at the first sign of bleeding.

The serum was given for a single day in some cases, and in others the treatment extended for five or seven days. In his more recent cases Welch gave a larger quantity of serum in bigger doses. One infant that had signs of intracranial hemorrhage on the third day received a total of 630 c.c. of serum in seven days, administered in 23 doses. The child recovered and was reported in normal health when one year and six months of age.

Welch believes that the underlying condition in these bleeding cases is some disturbance of the endothelium of the blood vessels that is caused by malnutrition which can be corrected by the beneficial effects of the serum. In regard to the injection of whole human blood, he is of the opinion that the procedure is not harmless. Blood transfusion, he states, is the only measure to be used in cases where the cellular elements of the blood are greatly diminished by prolonged hemorrhage.

*Whole Human Blood.*—Schloss and Commiskey introduced a modification in Welch's method of treatment by injecting whole human blood instead of blood serum. In two recent papers<sup>1, 15</sup> they report 9 cases treated by this method with 2 deaths. Myers<sup>16</sup> reports 2 successful cases in which he injected 8 c.c. of whole blood in 2 doses and 9 c.c. in 3 doses. The blood is drawn from the elbow vein of an adult, usually one of the parents, with a needle and ordinary syringe and immediately injected under the skin of the infant's back. Schloss and Commiskey recommend the use of 10 to 30 c.c. of blood, which is repeated every four or eight hours as long as the bleeding persists. The blood is absorbed within two or four hours. The procedure is simple, perfectly harmless and can be applied without delay. These writers believe that some localized vascular lesion in these cases is probably the immediate cause of the hemorrhage and that the



bleeding is uncontrollable because of a defect in the infant's blood which prevents proper coagulation. In their opinion it is more logical to inject whole blood than blood serum to supply the elements that are essential to blood coagulation. In the cases in which the bleeding is profuse, and, as a rule, quickly fatal, they believe that immediate transfusion is probably the only means from which any result could be expected.

*Blood Transfusion.*—Blood transfusion was first employed in hemorrhagic diseases of the newborn in 1909 by Lambert, Carrel and Brewer.<sup>17</sup> This was followed by the reports of 5 single cases which were collected by Lespinasse and Fischer<sup>18</sup> in 1911, when they published a sixth case of their own which was treated by transfusion. In this series the bleeding was promptly stopped by this procedure; 4 cases were cured and 2 cases, probably of syphilitic etiology, terminated fatally eight and nine days after the transfusion. Bernheim<sup>19</sup> has recently published a single successful case. Within the last two years the writer has treated 11 cases of hemorrhagic disease of the newborn by transfusion, which will be considered later in this paper.

A review of the cases in which transfusion was performed on the newborn by the methods usually employed with adults, shows that under these circumstances this procedure is technically too difficult to be practical for any but a surgeon experienced in blood-vessel surgery. In a newborn infant the veins are so small or inaccessible that it is not easy to unite the vessels of donor and recipient by the means ordinarily used in transfusion, but once this connection is established the small amount of blood needed can be quickly transferred. The duration of flow in my cases varied from three to six minutes.

An infant of 8 pounds is estimated to have a total blood quantity of a little over 6 ounces. Since experimentally we know that an animal may not survive the loss of one-half its blood, it is evident that even with an exsanguinated infant less than 3 ounces of blood need be transfused.

*Transfusion with Glass Tubes.*—About two years ago it occurred to me that the glass tubes of Brewer<sup>20</sup> might be adapted to meet these peculiar conditions in infants. Some experimental work on this subject and the technic of transfusion by means of coated glass tubes have been described in previous articles.<sup>21, 22</sup> At the present time it will suffice to review briefly the essential points of that work. The glass tubes are 13 cm. long and 3 mm.

in diameter. The end which is inserted into the infant's vein is about 2.5 mm. in diameter. At either end the tubes are encircled by a shallow groove that carries the ligature by which the vessel is secured. The tubes are coated with paraffin 54° or a wax mixture consisting of stearin, vaselin and paraffin, in 1,-2,-2-proportions, to prevent clotting of the blood. The danger of air embolism may be eliminated by filling the tubes with salt solution, which is held in the tube by placing in one end a small plug of sterile cotton covered with vaselin. The vessels to be connected in these transfusions are the radial artery of the donor, usually the father, and the largest accessible vein of the infant. In my first 3 cases I used the baby's femoral vein, and found it rather awkward on account of the depth and numerous branches. Since then I have employed the external jugular vein, which is large, superficial and has no troublesome branches. This change in technic has greatly simplified the operation. The artery of the donor is isolated under cocain after the manner usual in transfusions; the infant sometimes receives a small injection of morphia, and, if needed, just enough ether to enable the surgeon to operate. The position of the external jugular vein can usually be seen before operation when the child cries. If both are visible I use the vein on the right side. It is exposed by a one-half inch transverse incision which is made in a fold in the skin about the middle of the side of the neck.

The vein is clamped with a light artery clip as low as possible and tied above. With this ligature as a guide the vessel is then partly cut through and into this slit are inserted three small hooks so placed as to expose the lumen of the vein. This part of the operation is rather delicate and requires a good light. The tube is then inserted into the vein and secured by a ligature. After removing the cotton plug, the other end is tied into the donor's artery. In these transfusions a flow of five minutes is usually sufficient. Care should be exercised that the blood is not transferred too rapidly or in too large a quantity.

Transfusion is stopped when the infant's face regains a normal red color. By this method I have experienced no trouble in transfusing 11 infants with hemorrhagic disease of the newborn. The operation is a rather delicate one but not especially difficult, and does not subject the infant to any great strain.

Six of the following reports are collected from my previous articles. The 5 other cases are recent transfusions for hemor-

rhagic disease which are here reported in detail for the first time. Four additional cases will be described which were not treated by transfusion.

CASE REPORTS: CASES TREATED BY TRANSFUSION.

CASE I. James S. was referred to the Infants' Hospital in Boston by Dr. Homan, of Everett, Mass., October 11, 1910. The child, born two days before, at full term, normal delivery, was perfectly well up to 1 A.M. on the day of entrance, when he began to vomit blood in large clots. He vomited frequently and spat up bright red blood after each feeding. During the day he had three movements containing red blood. He was brought to the hospital at 4 P.M.

The child weighed  $6\frac{1}{2}$  pounds. The skin was slightly jaundiced and very pale. There was still a trace of color in the lips. The skin about the mouth and anus was stained with fresh blood. There were several small points of subcutaneous hemorrhages on the upper lip and in the groin. Heart, lungs and abdomen were negative. The umbilical cord was normal. The pulse could be felt at the wrist, but was too rapid to count accurately.

The infant had evidently lost considerable blood, enough to seriously affect his condition, and was in a poor state to resist any further hemorrhage. For this reason it seemed best not to temporize with the less radical measures, but to proceed, as soon as possible, with a transfusion which would stop the bleeding and, at the same time, restore the cellular elements of the blood. The father of the child served as donor. While awaiting his arrival, and preparing for the operation, the infant vomited blood twice and passed another bloody stool.

The father's left radial artery was exposed under cocain in the usual manner. The child was then given a little ether and its femoral vein isolated for about an inch in the middle of the thigh. The vein was collapsed, and, in this state, seemed scarcely more than one millimeter in diameter. Considerable difficulty was experienced in exposing the lumen of such a small vein, but once the three hooks were in place it was possible to dilate it enough to admit the tube. Following the technic already described, the vessels of the donor and recipient were connected with a coated glass tube 8 cm. long and 3 mm. in diameter. In this case the entrance of air was obviated by using a tube filled with salt solution. The blood had been flowing for about one minute when, by some mischance, the tube was pulled from the father's artery.



Before it could be replaced the blood had clotted in its lumen. The extra tube, which had been prepared, was then substituted and the blood allowed to flow for four minutes. The infant rapidly took on a healthy, red color. The face was becoming a trifle dusky when the transfusion was brought to an end. Counting the time the first tube was in use, the total flow must have been of about five minutes' duration.

The next day the patient was to all appearances a normal, healthy baby. There was no more bleeding. He vomited once after the first whey feeding. During the day he passed two dark movements. Three days after the transfusion the wound was clean and the infant was sent home to be nursed by the mother. A month later he was reported in perfect health.

CASE II.—Chester P. was born February 14, 1911, four days before entrance to the Infants' Hospital, and for the first two days appeared to be a normal, healthy baby. On the third day he did not seem so well and passed a movement containing dark blood. The next day the baby had six black movements, consisting, for the most part, of clotted blood. He vomited once, but the vomitus contained no blood. The bleeding from the bowel continued until the infant became too weak to nurse, and he had lost his healthy color when brought to the hospital at 1:30 P.M. on the fifth day.

When examined at 4 P.M. he was pale, but not blanched. There was some color in the lips and fingers. He had a strong cry. Heart and lungs were negative. An odor from the umbilical dressing could be easily detected. The cord was moist and sloughing, but there was no redness or induration in the skin about the umbilicus. The temperature was subnormal. The pulse was 150 at the wrist, and the respirations were regular and not rapid. The hemoglobin was 35 per cent.

At 5 P.M. the baby had a large, dark movement with a suggestion of red color. At 6 P.M. there was another dark movement, but no fresh blood. At 9 P.M. he had a small, dark movement with a little fresh blood.

The baby was given 10 c.c. of a thrombin solution, prepared by Dr. W. P. Lucas, at 11 P.M., and this was repeated twice the next morning. During the night the infant had a normal fecal movement, but at 8 A.M. he passed another dark stool containing a little fresh blood. The morning temperature was 101.8 F.°

At this time the baby's condition seemed as good, or better,



than the day before, and it was decided to postpone transfusion, with the understanding that it should be done in the evening for any more bleeding, even if the infant's condition had not become worse.

The baby showed no change up to 1:30 P.M., when there was a sudden collapse. He lost all his color, the breathing became labored and the pulse was imperceptible at the wrist; hands and feet were cold. He passed a small movement of fresh blood. The father was summoned at once to serve as donor.

The operation began at 2:30 P.M. The father's left radial artery was exposed under cocain. The baby needed almost no ether. His femoral vein was isolated in the left thigh. The subcutaneous tissues were exsanguinated and the little blood which escaped from the deeper vessels was thin and watery. The coated tube used in this case was 12 cm. long and 3 mm. in diameter, and this extra length made it easier to complete the connection with the donor's artery.

The father had a strong pulse and large radial, and the baby was filled with blood very rapidly. The connection was maintained for four minutes, and during this period the flow was checked three times, for a few seconds, when the infant's face became a little dusky. At the end of the operation the child began to struggle and cry vigorously. The hemoglobin, taken immediately after the transfusion, was 90 per cent.

The baby slept well during the night. He regurgitated his feeding once and had one dark movement. There was no sign of fresh bleeding. In the morning the temperature was 99.8 F.° During the day he had two more dark movements. The second day after the operation the temperature was normal and the baby passed a normal, yellow movement. One week after the transfusion the infant was taking his feedings well. He had a good color and normal temperature.

CASE III.—The patient was born on October 18, 1911, low forceps delivery by Dr. Robert M. Green. The infant weighed 6½ pounds at birth, and appeared in every way to be a normal female child. She took the breast well and passed three normal meconium movements during the first two days. On the third day at 8:30 A.M. the infant passed a stool containing bright red blood. Similar movements, consisting almost wholly of red blood, were passed at 9 and 10:30 A.M.

At 10 A.M. rabbit serum—30 c.cm.—was injected subcutane-

ously, and at 12:30 2 ounces of a 2 per cent. gelatin solution were given by rectum. This injection was at once expelled with a fourth large movement, consisting of bright red blood. During the morning the infant received 11 mm. of paregoric and at 1:45 P.M.  $\frac{1}{64}$  gr. of morphin.

When examined at 3 P.M. the infant was very pale, although there was still some color in the lips. A pulse of poor quality could be counted, between 150 and 160 at the wrist. Heart, lungs and abdomen were normal. There was no sign of bleeding from the nose, mouth or umbilicus. The umbilical stump was clean. The skin about the anus was stained with fresh blood, but there were no subcutaneous hemorrhages. The infant's general condition was poor, and it had grown worse so rapidly in the last two hours that it seemed best to do a blood transfusion as soon as possible.

The father served as donor, and his left radial artery was isolated under cocain in the usual manner. The infant did not require ether. The external jugular vein was exposed through a half-inch transverse incision, which was made in a fold in the skin about the middle of the neck on the left side. In the collapsed state this vessel, which has thin walls, appeared to be very small, but when the lumen was exposed it proved to be as large as the femoral vein, or even larger. A coated glass tube was then tied into the vein, following the technic which I have described in detail in the previous paper. The tube was 12 cm. long, and the end which was inserted into the vein was about  $2\frac{1}{2}$  mm. in diameter, a little smaller than any of the tubes which I had used in other cases. The blood was allowed to flow in this case for five minutes. The force of the donor's blood stream was slightly diminished by pressure on the artery, and from time to time the flow was checked for a few seconds to prevent a too rapid filling of the infant's heart.

The transfusion was continued until the infant's face had regained its normal color. After ligating the vein, the wound in the neck was closed with two plain catgut sutures and covered with a small cocoon. At the end of the operation the baby had a full pulse of 120.

On the following day two large dejections of dark blood were passed. The child took whey and breast milk eagerly, and thirty-six hours after the transfusion began to have normal fecal movements. There was no sign of further hemorrhage and the

infant has been in perfect health up to the present time, one year after birth.

CASE IV.—The infant in this case, a patient of Dr. Charles H. Hare, was born on December 18, 1911, weighed 9 pounds at birth, and seemed to be a normal girl baby. She was breast-fed and had normal movements up to December 20, 1911. On this day, at 2 A.M., there was a small hemorrhage from the mouth. Two and one-half hours later this was repeated in larger amount. At 11:30 A.M. the baby passed a dark bloody movement which soaked through two napkins, a flannel robe and a pad on the bed. At noon she bled again from the mouth and at 4 P.M. had another movement of dark blood. During the afternoon rabbit serum, 15 c.c., was given twice subcutaneously. Up to this time the infant's condition had shown little change, but in the evening it began to fail and the pulse went to 160. At 9 P.M. there was a third large movement containing bright red blood. The patient was seen by Dr. John L. Morse at 10:30 P.M., and when examined another bloody movement was found in the napkin.

The baby was very pale and had a pinched look about the face. The pulse was 160 at the wrist and of poor quality, but the child had a fairly strong cry. Heart, lungs and abdomen were negative. There was no staining on the cord dressing. Mouth and throat were negative and there were no hemorrhages in the skin. The temperature was not taken. In view of the repeated intestinal hemorrhages and their evident effect on the child's condition, it was agreed that a blood transfusion was necessary. It seemed best not to move the patient, and the operation was done in the house by aid of electric light.

The father served as donor, and his left radial artery was exposed under cocain. The infant received gr.  $\frac{1}{64}$  of morphin fifteen minutes before the operation. The left external jugular vein was isolated under light ether and the father's artery and this vein connected by the same coated tube which had been used in the previous case. In this case the blood ran for six minutes before the baby's face showed a normal color. It was necessary to stop the flow at intervals when the pulse indicated that the blood was being transfused too rapidly. It was found that the full arterial stream would, after a time, first retard, then weaken and finally obliterate the infant's pulse. With this precaution, there was no difficulty in completing the transfusion. The pulse



at the end of the operation was 120 and of good quality. The small transverse wound in the neck was closed with one catgut stitch. In this case no particular effort was made to hurry the operation. It took altogether fifty-five minutes, and the infant was on the operation table from fifteen to twenty minutes of this time.

The convalescence followed the usual course. The child took water and breast milk the next day. In the morning there were two large dark movements, the last of which showed a little red color. The morning temperature was 103.8 (rectal) and the pulse 140. The child took nourishment well during the day and in the night passed a stool containing some fecal matter. On the second day after the transfusion the temperature was normal, the infant nursed well and had fecal movements without blood. There was no recurrence of hemorrhage, and the baby, now ten months of age, has been in perfect health up to the present time.

CASE V.—The patient was born of healthy parents on March 16, 1912, high forceps delivery by Dr. Edwin Sever, Jr., of New Bedford. The mother had previously given birth to two healthy children, the youngest of which was eleven years old. Family history otherwise negative. The child weighed 9 pounds at birth, was breast-fed and appeared to be an unusually robust normal infant up to March 18th.

During this day there was a little bleeding from one nostril and a few small subcutaneous hemorrhages appeared in the scalp. A small amount of blood was vomited in the evening. The next morning a dark spot was seen under the skin on the right cheek. In a few hours this hemorrhagic area rapidly increased in size and a large hematoma formed in the deep tissues of the cheek. At 7 A.M. the infant passed a stool of bright red blood. This was followed by four other bloody movements; the last movement, also of fresh blood, occurred at 10 P.M., while preparations were being made for transfusion. The baby vomited a little blood during the day and had some bleeding from the umbilicus. The morning and evening temperatures on the second day were 102° and 100°; on the third day 100° and 99.8°.

The case was seen in consultation by Dr. C. A. Pratt, of New Bedford, who recommended blood transfusion.

*Physical Examination.*—A well-developed and nourished male baby. Superficial tissues somewhat shrunken, but not pale. Pulse, 120-130, counted with difficulty at the wrist. Heart,



lungs and abdomen negative. On the scalp and on the right knee there were a few small areas of ecchymosis. The right cheek was made prominent by a diffuse swelling, which was soft but not tender. The overlying skin was normal, the subcutaneous tissues had a bluish tinge. The buccal surface of the cheek was almost black in color. There was no bleeding from the nose or mouth. The umbilicus was moist, but there was no odor. Its pressing was stained with the blood of recent hemorrhage. The napkin contained a movement of about  $1\frac{1}{2}$  ounces of fresh blood which was passed during the examination. While the infant was not exsanguinated and the general condition was fair, in view of the multiple sources of bleeding and the persistence of the intestinal hemorrhages it seemed advisable to do a blood transfusion to check the hemorrhages.

*Operation.*—The father served as donor, and his left radial artery was isolated in the usual manner. The infant was given morphia gr.  $\frac{1}{64}$ , and the left external jugular vein was exposed under light ether anesthesia. This vein and the father's artery were then connected by a coated glass tube, 12 cm. long, as has been described in the previous operation. The donor was a large man with a pulse of good volume, and the small amount of blood needed by this infant was quickly transmitted. The blood ran for three minutes. At the end of the transfusion the baby was a little dusky, but regained the normal color as soon as the head was elevated. The pulse was 105 and of good quality after the operation.

During the night the baby nursed at the breast. One black movement was passed the next day. Fecal matter appeared in the stool eighteen hours after operation. A general urticarial eruption, which resembled an anti-toxin rash, developed forty-eight hours after the transfusion and faded in a few days. There were no more hemorrhages. The swelling in the cheek gradually subsided, and within a few days after the operation the infant was taking nourishment well and gaining weight in a normal manner.

CASE VI.—The patient was born, normal delivery, on March 18, 1912, at the Boston Lying-in Hospital, in the service of Dr. Charles M. Green. The child weighed 8 pounds 6 ounces at birth, was breast-fed and had normal movements until March 22d. The family history was negative.

In this case the hemorrhages began on the fourth day and

continued until the afternoon of the fifth day, when blood transfusion was performed. Throughout the illness the bleeding was confined to the gastrointestinal tract and manifested itself chiefly by repeated bloody stools. The first movement of blood was found at 9 A.M. on the fourth day. Within twenty-four hours there were seven such stools. The infant was given rabbit's serum subcutaneously in three doses of 15 c.c. each and 5 mm. of paregoric every four hours. The next day the hemorrhages continued and three more dejections of blood were passed up to the time of operation. All the movements, including the last one, which was passed on the operating table, consisted of bright red blood. The baby vomited blood twice on the fourth day. There was no temperature. The pulse gradually quickened as the child became weakened by the successive hemorrhages.

*Physical Examination.*—A well-developed, pale baby. Pulse at the wrist, 150, and of poor quality. Heart, lungs and abdomen negative. No subcutaneous ecchymosis. Umbilical stump dry and clean. Napkins containing recent movements showed a large amount of fresh blood. The red count was 2,800,000 and the hemoglobin 70 per cent., Tallquist Scale. The child refused nourishment and had failed rapidly in the last twenty-four hours. Transfusion was done as soon as the donor could be secured.

*Operation.*—The father served as donor. Following the technic of former operations, the donor's left radial artery was connected with the recipient's right external jugular vein by a coated glass tube, 12 cm. long. The infant received morphia gr.  $\frac{1}{60}$  and no anesthetic was required during the operation. The actual duration of the transfusion was three minutes.

As the father was an unusually good subject in this instance, a vein in his forearm was first exposed in the hope that a vein-to-vein transfusion might be done, in order to simplify the operation for the donor. But even with the venous return completely blocked by a tourniquet, the pressure in the vein did not seem to be sufficient to warrant the attempt, in view of the child's poor condition. Rather than risk the delay of a failure, this method was abandoned for the certain artery-to-vein procedure.

In this case the right, instead of the left, external jugular vein was exposed and it was found that the use of vein and artery of opposite sides facilitated the ease of uniting the two vessels.

The post-operative course followed that of the previous cases.

The infant took breast milk from the bottle in the evening. The next day four tarry movements were passed and fecal matter appeared in the stools thirty-six hours after operation. The red count twenty-four hours after transfusion was 4,200,000. The hemorrhages did return and the infant left the hospital in normal health, four days after operation.

CASE VII.—A female infant, the first child of healthy parents, was born on April 16, 1912, low forceps delivery by Dr. Franklin S. Newell, of Boston. Birth weight, 6½ pounds. Had pressure marks on forehead, but no break in the skin. The second day the infant took the breast and passed normal meconium stools. In the morning a swelling as large as an egg, evidently a hematoma, appeared in the right parietal region. A similar swelling was noticed on the left side of the head in the evening. On the third day the temperature was 103.6°, pulse 140 and respirations 40. The swellings increased in size, the infant refused to nurse and vomited all feeding. Seen in consultation by Dr. Fritz Talbot. In the evening a swelling was noticed in the right cheek, which rapidly increased in size. This was punctured with a fine needle and found to contain blood.

*Examination.*—A small, poorly nourished, pale baby in stupor. Temperature 104.6°, pulse, apex beat, 176, respirations 60. Mucous membranes pale, slight icterus. Chest and abdomen negative. Cord clean. Arms rigid, no spasm. Eye-balls turned downward. Anterior fontanel not bulging. On the right side of the head a prominent soft fluctuating hematoma, which extended from the coronal suture to the occiput and from the ear to the vortex, where it was separated by a depression from a similar swelling about one-half as large on the left side of the head. In the right cheek was a firm tumor the size of an egg, with a bluish tinge which was almost black on buccal surface. Small ecchymoses on left jaw and ear. No sign of other hemorrhages.

*Treatment.*—Transfusion with coated glass tubes, the father's left radial artery was united to the infant's right external jugular vein. Duration of flow five minutes. Child regained color and cried vigorously. Pulse 120. The day after operation, temperature 103.6°, pulse 130. The hematoma in the cheek had diminished in size, those under the scalp were unchanged. The infant had a difficult convalescence. The high temperature persisted and the child did not nurse well or gain weight for about two



weeks. The hematomas were tapped twice, giving old blood, but no pus. As soon as the blood was absorbed the infant began to gain weight, and at six months of age he is reported to be a normal, healthy child.

CASE VIII.—Baby M. was born of healthy parents in the Out-Patient Department of the Boston Lying-in Hospital, normal delivery, on April 20, 1912. Was breast-fed and seemed a healthy child up to the third day; at 1:30 P.M. had the first bloody stool, the second at 11 P.M. and the third at 2:30 A.M., the time of examination. Before these signs of hemorrhage, nothing unusual had been noticed about the baby.

*Examination.*—A sick-looking, limp, pale infant. Temperature not taken, respirations 60, pulse 140. Heart and lungs negative. The abdomen was soft, not distended, and did not seem to be tender. The umbilical cord was clean. There was about an ounce of fresh blood in the napkin. Hemoglobin 80 per cent.

*Treatment.*—Transfusion with coated glass tubes; the father served as donor; his left radial artery and the infant's right jugular vein were united with a glass tube in the usual manner. Duration of flow, four minutes. The infant regained color and seemed in good condition. Vomited a little fresh blood immediately after the operation. For the next nine hours the case apparently followed the usual course; the infant took breast milk in the morning and passed two movements of black blood. At noon the child vomited about a drachm of blood after feeding, was evidently in pain and did not seem so well. In the afternoon the infant failed rapidly, and was moribund when seen at 8:30 P.M. Pulse and respirations were 180 and 60. The child had lost the red color and the abdomen was distended, especially over the stomach. It was thought that the condition was due to a recurrence of the hemorrhage. The child died before midnight. Autopsy showed a diffuse peritonitis. As soon as the abdomen was opened there was an escape of foul gas. The cavity contained a foul bloody fluid. Stomach and intestines were collapsed and matted together with fibrin. No perforation could be found. There were no visible ulcerations in the duodenum or stomach. The bowel contained some blood and mucus and the mucosa was injected in portions of the ileum. Umbilicus normal. Small amount of bloody serum in chest. Heart and lungs normal.

CASE IX.—W. S., a male infant, was born May 9, 1912. The



parents denied syphilis. No miscarriages. One other child had a skin eruption and cold in the head and died at three months of meningitis. The infant of this case was born after an easy labor at eight months. Was breast-fed and appeared to be normal up to the seventh day, when the cord came off with a little bleeding. An ecchymosis appeared on the right scrotum on the eighth day. On the ninth and eleventh days there was some blood in the stools. The umbilicus began to bleed on the twelfth day, and at 2 P.M. the child was brought to the Infants' Hospital. The bleeding from the umbilicus persisted during the day and following night, in spite of the applications of the styptics and constant local pressure. There was some nasal hemorrhage on the morning of the next day.

*Examination.*—Well-developed and nourished, pale infant; desquamation on palms and soles of feet. Heart and lungs negative. Abdomen soft and slightly distended. Liver and spleen easily felt. Ecchymoses in skin and right scrotum, right elbow and both shoulders. The umbilicus was not septic, but from its base there was a constant oozing of watery blood, which soaked through a gauze sponge, even when firm, direct pressure was applied. Pulse 140, temperature 96.5°, respirations 43. Hemoglobin, 40 per cent. Red count, 2,600,000. Coagulation time, over thirty minutes. The bleeding time from the puncture wound in the ear was over an hour.

*Treatment.*—Transfusion after the usual method with glass tubes, connecting the left radial artery of father with right external jugular vein of the infant. Normal red color returned to the infant's face after a flow of four minutes. The bleeding from the umbilicus began to diminish at once and stopped within thirty minutes. The child took nourishment well, and there was no recurrence of hemorrhage while in the hospital. Six days after the transfusion the cord was dry and clean. The skin of the face was dry and wrinkled and began to desquamate. Liver and spleen could be easily felt, 5 cm. and 4 cm. below the ribs. Blood was taken from the heel for the Wasserman Test, and normal clotting occurred in the wound. The Wasserman reaction was positive. The infant was discharged to the Out-Patient Department of the hospital on the tenth day, where the syphilis was treated with mercury. Three weeks after the transfusion there was some bleeding from the nose and eyes and the child's body was covered with a syphilitic eruption. The disease

was not controlled by mercurial treatment, the infant lost weight steadily and died on June 25th, about a month after the transfusion.

CASE X.—J. C., the first child of healthy parents, was born August 25, 1912, at 11 A.M., easy labor, normal delivery by Dr. F. R. Jouett, of Cambridge, Mass. Birth weight,  $9\frac{1}{4}$  pounds. In the afternoon of the second day the infant became restless and cried as if in pain. Toward evening he looked a little pale. At 7 P.M. a meconium stool was passed with some blood. A second meconium dejection contained no blood. Between 8 P.M. and 11 P.M. there were four unusually large movements of bright red blood. The infant rapidly grew pale and weak.

*Examination.*—Well-developed and nourished baby, face pale and pinched. Temperature not taken. Pulse could not be counted at the wrist. Heart beat rapid, sounds clear. Lungs negative. Abdomen negative. Cord normal. No ecchymoses in the skin. Hemoglobin, 70 per cent.

*Treatment.*—Transfusion with coated glass tubes; the father served as donor, his left radial artery was united with the infant's right external jugular vein. The vessel could not be located before incision, and when exposed seemed very small in a collapsed state, but admitted the tube without dilatation. In this case the flow of blood was slowed by contraction of the donor's artery, and the connection was maintained for nine minutes before the infant regained a normal red color. The tube was patent at the end of the transfusion. The child slept during the night and nursed at 6 A.M. Temperature normal. At 7:30 P.M. one large movement of black blood. Fecal matter appeared in the stools on the next day. The stitches were removed on the sixth day and the patient was discharged well. Two months later he was reported to be in perfect health.

CASE XI.—R. N., a male child, was born in Ayer, Mass., on November 2, 1912, normal delivery by Dr. Frank S. Bulkeley. No history of syphilis. Parents have six other children. The mother has had two postpartum hemorrhages and one of the children bled an unusually long time after a circumcision operation. The infant was breast-fed and seemed normal for the first thirty-six hours. On the second day a small red stain was noticed on one napkin. On the third day there was a moderate hemorrhage from the base of the cord, which continued during the day in the form of a persistent oozing. At 2 P.M. on the next

day this bleeding became more profuse, and the cord was ligated without avail. At 5 P.M. 15 c.c. of rabbit's serum were given without effect. The hemorrhage increased and the infant's condition began to fail. The patient was brought to the Infants' Hospital in Boston at 9 P.M. in a moribund condition. The garments covering the abdomen were saturated with blood which had been lost during the journey to the hospital. When seen shortly after entrance the infant was in such an alarming condition that a full physical examination was not made. The baby was white and comatose, the respirations were scarcely perceptible and the heart sounds were weak and irregular. Although the case seemed to be hopeless, transfusion was done as soon as possible. Almost no time was spent in preparation, and the operation was accomplished in about fifteen minutes. The infant was on the operating table about one-half of this time. During the procedure the baby took an occasional gasping breath. The transfusion lasted for two or three minutes and resulted in an immediate improvement in the pulse, but did not affect the respirations. After interrupting the flow of blood the infant was put at once into a pail of hot water and treated like an asphyxiated newborn child. The breathing gradually improved and the baby became a normal red color. After midnight he slept some and took 15 c.c. of whey twice in the morning with a Beech feeder. The bowels moved four times, once with normal fecal matter and three times with a foul, pinkish mucus, which was positive to the Guaiac test. There was no bleeding from the cord or operation wound. The temperature was 100.8°, pulse 150, respirations 68. The infant was semi-comatose, and when aroused would cry feebly. In the afternoon he refused or was unable to swallow. Pulse and respirations gradually weakened and the infant died twenty-four hours after the transfusion.

#### ADDITIONAL CASES.

CASE XII.—Baby B., born in Boston Lying-in Hospital, June 25, 1912. Normal multiparous labor, O. D. A. Small caput. Seemed a normal infant up to the fourth day, when the child refused to nurse. The next day the caput was larger and the child had a convulsion. On the sixth day the caput continued to increase in size; ecchymoses appeared on arms and back. The infant grew pale, was semi-comatose and seemed unable to swallow.



*Examination.*—A pallid, semi-comatose baby. Heart, lungs and abdomen negative. Hematoma in median occipital region. Small subcutaneous hemorrhages on arm and back. Anterior fontanel level with skull; pupils were dilated and did not react to light. Arms held flexed at wrist and elbow. Twitching of hands. Left knee-jerk increased. Temperature subnormal, pulse 150, respirations 30 to 40. Lumbar puncture gave blood-stained spinal fluid. Fifteen c.c. of whole blood were injected under the skin of the child's back and repeated with a 7 c.c. dose in four hours. The blood was quickly absorbed, but there was no improvement or change in condition before the infant's death.

*Autopsy.*—Pericardium and stomach contained a little bloody fluid. The adrenals were each reduced to a large single cyst containing blood. The mass over the occiput was a hematoma. A subdural blood-clot was found overlying the entire right hemisphere, and extending inferiorly along the base down into the spinal canal.

CASE XIII.—A colored infant, born in Boston Lying-in Hospital, normal delivery, on August 22, 1912. Birth weight, 7.5 pounds. Mother had had three miscarriages at seven months and was treated during this pregnancy for syphilis. The infant nursed well, but lost weight the first week. The cord came off on the eighth day, leaving a moist stump. On the eleventh day the baby spat up a little blood. The umbilicus began to ooze blood the next morning. This hemorrhage continued during the day, in spite of pressure and stiptics. In the afternoon the infant's condition became serious, she fell into a stupor and seemed unable to swallow. The arms were rigid, but there were no twitchings or convulsions.

*Examination.*—Fairly well-developed and nourished, semi-comatose colored infant; pulse weak and irregular, 80 to 100. Cheyne-Stokes respiration. Bulging fontanel, right eye closed. Pupils dilated. Slight spastic condition of arms and legs. Knee-jerks increased. No definite paralysis. Chest negative. Abdomen soft. Liver and spleen not felt. A slight persistent oozing of blood from umbilicus. No other visible hemorrhages. Lumbar puncture gave 4 c.c. of blood-stained spinal fluid.

*Treatment.*—Thirty-five c.c. of mother's blood injected into the infant's back. During the night the child swallowed a few drams of milk, the bleeding from the naval stopped for a time, but recurred in the morning before the infant's death at 7 A.M.



*Autopsy* showed an intracranial hemorrhage. The left side of the brain was covered with a large blood-clot, and there was a small amount of blood over the pia on the other side. No sign of other hemorrhages.

CASE XIV.—Baby B., a first child, born in Bangor, Me., 11 P.M., June 26, 1912. Low forceps delivery. Mother had  $\frac{1}{8}$  per cent. albumin in urine during the last month of pregnancy. Parents otherwise healthy. On the second day the infant had two convulsions, passed meconium and was given castor oil and the lower bowel was washed out with salt solution. During the night the infant had profuse hemorrhages from the gastrointestinal tract; the first bloody movement was passed at midnight on the 28th. This was followed by six other large, bloody stools within the next three hours. The infant also vomited some blood. Seen by Dr. F. B. Talbot, of Boston, at 3:30 A.M.

*Examination* (by Dr. Talbot).—A slightly cyanotic infant with a pulse which could not be counted at the wrist. Anterior fontanel level and open, posterior fontanel admits the finger. Pupils, equal, react to light. No stiffness of neck; heart, lungs and abdomen normal. Cord healthy, knee-jerks equal and normal. No Kernig sign. At 4.30 A.M., while awaiting the arrival of the writer to do transfusion, 30 c.c. of whole blood, taken from the father's right median basilic vein, was injected subpectorally into the infant. This apparently had no effect on the hemorrhage and the bloody movements continued up to the infant's death, which occurred four hours later, before transfusion could be performed.

CASE XV.—Baby L., a male infant, 10.5 pounds, born of healthy parents, low forceps delivery by Dr. Charles Day, of Hingham, Mass., August 16, 1912. The infant was asphyxiated at birth and remained somewhat cyanotic during the first twenty-four hours. Had normal meconium movements on the first, second and third days. On the evenings of the second and third days spat up a little fresh blood. On the fourth day at 2 A.M., the baby had a fairly large bloody movement with clots. Had small movements of bright red blood at 7, 9 and 10:30 A.M. Vomited a little blood in the morning.

*Examination*—A large, strong baby, who cried hard during the examination. Fontanels not bulging; face pale; lips and ears red. Hands and arms a little dusky. Respirations between 40 and 60. Lungs negative. Heart rapid, sounds clear;

pulse 160 to 180. Abdomen normal. Cord dry and clean. No subcutaneous hemorrhages. On the head and soft palate were a few ecchymotic spots. Hemoglobin, 75 per cent. The infant was given 15 to 20 c.c. of whole blood under the skin of the back. During the struggle caused by this procedure the child passed a movement of dark blood. In the afternoon the infant did not nurse well, but otherwise seemed in better condition. Had a small movement of black blood, which stained a 2-inch area on the napkin. This was repeated in the evening. The nurse reported that the child cried hard at times and appeared to be stronger than in the morning. A little before 11 P.M. there was a sudden change for the worse, the infant passed a large movement of fresh red blood and died within half an hour.

#### REVIEW OF CASES.

In everyone of the 11 cases treated by transfusion the immediate effect of the procedure was to check the bleeding and correct the anemia. The infants in the successful cases were apparently changed at once from sick to healthy children, who slept and nursed in a normal manner. The only exception to this rule of easy convalescence was Case VII., with extensive hemorrhages under the scalp. This infant did not do well until these hematomas had been absorbed. The cases of melena usually passed two tarry stools before fecal matter appeared in the movements.

Eight of the 11 cases treated by transfusion were cured. One case (VIII.) died within twenty hours of a diffuse peritonitis which, as shown by autopsy, was undoubtedly present and undetected at the time of operation. One other case (IX.), which ended fatally, was probably of syphilitic etiology. The bleeding was checked by the transfusion, but the infant died of the syphilitic infection about one month after the operation. The most recent case (XI.) of this series, although unsuccessful, furnished a good illustration of the possibilities of transfusion in hemorrhagic disease. The patient, three days old, was brought to the Infants' Hospital in Boston, six days ago, at 9 P.M., on November 6, 1912. The cord had been bleeding for two days and the child reached the hospital in an exsanguinated and moribund condition. Death seemed a question of only a few minutes. Transfusion was done as quickly as possible with little regard for aseptic technic. The infant took an occasional shallow, gasping breath during the operation, which lasted about fifteen minutes.

The pulse was improved by the transfusion, but the new blood had no apparent effect on the respirations. After immersion in a pail of hot water the breathing slowly improved and the infant's skin became red. The baby was very weak, but slept during the night and took a little whey in the morning. At noon the child refused nourishment, the pulse and respirations gradually failed and death resulted twenty-four hours after the transfusion.

The cases which recovered have been traced with one exception. The oldest child is now two years old and all are reported to be in perfect health with no abnormal tendency to bleed.

The 4 additional cases not treated by transfusion received injections of whole human blood. In 2 of these infants, which were apparently cases of true hemorrhagic disease of the newborn, the bleeding took the form of an intracranial hemorrhage, which was indicated by a lumbar puncture and demonstrated at autopsy. The other 2 were cases of melena neonatorum. One infant died very quickly of a continuous profuse hemorrhage; the other died suddenly of an unexpected recurrence of the bleeding.

Although these 4 cases received injections of whole human blood the fatal result which occurred in all of them cannot fairly be taken as evidence that this method is ineffectual, since 3 of the cases were moribund at the time the injections were given, and in the other case the injections were not repeated as prescribed in this form of treatment.

In view of the autopsy finds, transfusion, in all probability, would not have averted the fatal result in the two infants with intracranial hemorrhage. It is a question whether, in addition to measures intended to check the bleeding, further operative procedure is advisable, in these cases, to remove the clot or to relieve the cerebral pressure. It is impossible to state with certainty that transfusion could have saved the 2 cases of intestinal bleeding. In the light of past experience, it is a matter of regret that transfusion was not done in Case XV. by a mistake in judgment, and that death occurred so quickly in Case XIV. that the operation could not be performed.

#### SUMMARY.

Several cases in this series received animal serum subcutaneously without apparent result, and were subsequently cured by



transfusion. This agrees with the experience of other men in this respect and without justifying the statement that animal serum is altogether ineffective, it confirms our opinion that human blood or its derivatives is more valuable in these cases. As my experience in the treatment of hemorrhagic disease is almost wholly confined to transfusion, I am naturally prejudiced in favor of this procedure. The good results which have been obtained by Schloss and Commiskey and others who have used whole human blood, and Welch, in his large series of cases with blood serum, is sufficient evidence that these measures are efficacious in checking the bleeding in this disease.

If, as seems possible, the bleeding in many of these cases of hemorrhagic disease is due to a defect in the infant's blood, which is apparently improved by all three methods of treatment, it would seem that transfusion is the ideal method, because it restores directly to the infant's circulation all the elements needed for coagulation.

In addition, transfusion possesses the advantage of correcting the anemia by replacing the cellular elements which have been lost in hemorrhage. For this reason, as pointed out by the advocates of the other methods, blood transfusion is the only measure from which results can be expected in severe types of the disease in which the patients have been exsanguinated by continuous profuse bleeding.

The uniform success which has attended the use of the injection of whole human blood, blood serum and the transfusion of blood would lead us to believe that the best line of treatment to pursue in these cases is a rational combination of all three methods. In those cases in which the bleeding is rapid and profuse, and which are usually quickly fatal, an immediate transfusion is indicated. Since the disease, however, often begins with trivial hemorrhages, in such a case, if seen early, the easier and more simple methods of blood or serum injections are in order. Assuming that these two measures give equally good results, it would be advisable to make the first injection of whole blood to save delay and at the same time to collect enough blood to furnish serum for further treatment. This treatment should be continued if the bleeding stops or seems to be diminishing and the infant's condition remains good. Cases which do not follow so favorable a course, or cases that are not seen until the patient is exsanguinated by hemorrhages which have been going



on for some time, are more safely treated by transfusion. The procedure is more formidable than simple injection, but the results are immediate and permanent. Carried out by the method described above, the operation can be done with safety and without difficulty. Once accomplished, a case may be left with the assurance that the infant is in no immediate danger, which is of no small advantage when the case cannot be kept under constant observation.

Although it seems possible to save most cases of hemorrhagic disease by these measures which stop the bleeding, there are two forms of the disease in which a cure cannot always be effected by transfusion or any other method of treatment. The first form includes those cases in which the underlying cause of the bleeding, as bacterial infection, syphilis and ulcers of the stomach or duodenum is such as to be fatal in itself, and the second form comprises the cases with hemorrhage in the brain, adrenals, kidneys and liver in which the location, not the extent, of the bleeding is the vital factor. With these exceptions our experience to date with the use of human blood or its derivatives in hemorrhagic disease of the newborn seems to show that this agent is capable of checking the bleeding in this condition and that, by the proper application of one or a combination of the methods under discussion we can cure a large percentage of cases in this hitherto exceedingly fatal disease.

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# PYLORIC OBSTRUCTION, WITH A COMPARATIVE STUDY OF THE NORMAL STOMACH OF INFANTS.\*

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It is not the object of this paper, presented before a body of men particularly interested in the diseases of children, to take up in detail the various phases of this interesting condition, but to indicate how we may add, in an efficient manner, to the diagnostic resources already at hand, to the end that the diagnosis may be more readily established.

A review of the literature makes it very evident that the condition is spoken of under many varying titles in a very loose manner. This indefiniteness has arisen from the fact that there has not as yet been established a sharp line of demarcation among the various types of pyloric obstruction.

Various ingenious theories have been advanced which are supposed to account for its causation. One set of writers doubts that the condition is congenital at all, since its manifestations rarely appear before the third week. Others attempt to prove that it has its origin in fetal life and quote the case of Dent who found a so-called pyloric tumor at autopsy in a seven months' fetus.

Ibrihim and his followers take the ground that the cases are varying degrees of pyloric spasm, while another group of writers differentiate between cases having a true tumor and those of simple spasm.

An analysis of the rather voluminous writings on this topic, with its many theories, forces one to the conclusion that, after all, little has been gained by these controversial theories and that they do not tend to assist very materially in an elaboration of the diagnosis, nor to establish a definite form of treatment which, after all, is the important practical end which we seek.

Certain cases which exhibit the classical group of symptoms, namely, projectile vomiting, steady wasting, constipation, ex-

\* Read at the Joint Meeting of the Philadelphia, New England and New Jersey Pediatric Societies with the Pediatric Section of the New York Academy of Medicine, at Philadelphia, November, 1912.

cessive stomach peristalsis, in addition to a palpable nodular tumor in the pyloric region, we must regard as true cases of pyloric stenosis. Enough cases have been reported with pathologic findings resembling the specimen shown below (see Figs. I. and II.) which so uniformly bears evidences of a marked hypertrophy of the circular fibers of the pylorus, and a corresponding diminution in the lumen of the viscus at this point, that it would seem irrational to deny the existence of *this* type,

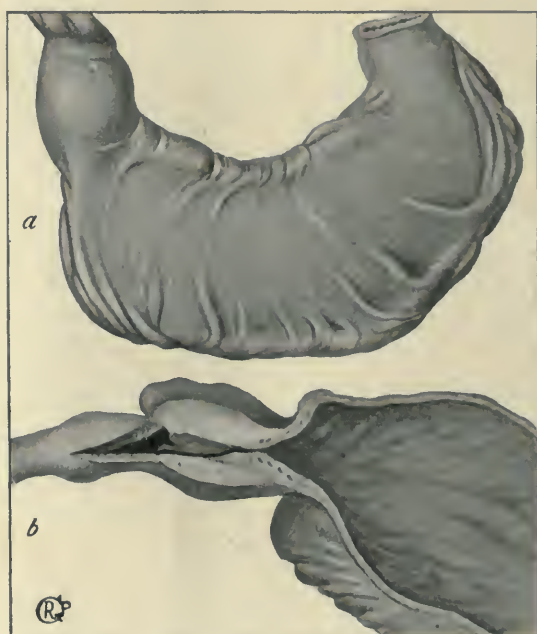


FIG. 1.—HYPERTROPHIC PYLORIC STENOSIS IN A SIX WEEKS OLD INFANT.

(a) Tumor.

(b) Longitudinal section, showing hypertrophy of circular fibres and extremely narrow lumen.

which may be termed surgical. On the other hand, cases are reported without the presence of any palpable tumor, but otherwise having all the usual symptoms in varying degrees of severity. It is perhaps in these that the greatest difficulty arises to determine the best method of procedure and in how far they may be surgical. The suggestion is given by the majority of writers that this group should be treated medically until the time when they resist medical management, as evidenced by a stationary or

falling weight. They may then be subjected to laparotomy with its high degree of hazard, the operator being necessarily uncertain as to his method of procedure until he has satisfactorily explored the stomach. If a tumor is found at the operation, which from its position has heretofore been undiscovered, the infant must be able to withstand a considerable degree of shock incident to the performance of a posterior gastrojejunostomy. If no tumor is found, little has been gained and possibly much lost by subjecting the impoverished infant to a loss of blood and further depletion of its natural resistance.

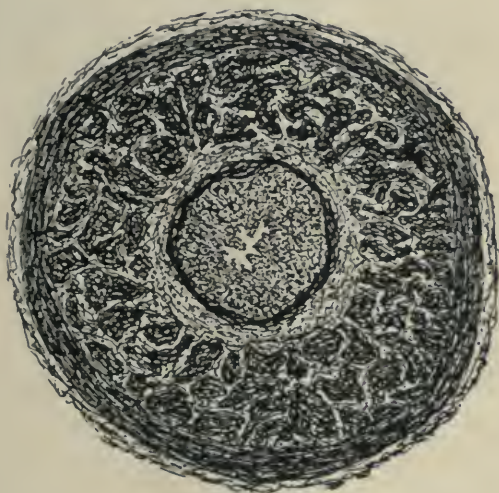


FIG. 2.—Cross section of tumor, same case as Fig. 1.

Hutchinson, in his Schorstein lectures, is of the opinion that all cases should be treated medically first. He can find no satisfactory means of differentiating the surgical from the medical without preliminary treatment.

If, therefore, we may, by the use of modern methods, so complete our diagnostic means that we can, with a degree of positiveness, determine whether or not a given case *shall* be operated upon, or treated *without* the use of a knife, we shall be making an advance worth while.

Notable achievements have lately been made in Roentgenology, especially with the use of bismuth in the alimentary tract. The workers have, however, for the most part, confined their studies to conditions as they appear in adults. The apparatus at



their command heretofore demanded exposures of varying lengths of time, and in the young, unruly subject it often necessitated the use of a general anesthetic to enable the operator to make an exposure with any degree of satisfaction. Modern apparatus, with the intensifying sheets, enables the radiologist to make instantaneous exposures, thus securing with the minimum effort, negatives of value.

With the able assistance of L. T. LeWald, of the Ed. M. Gibbs Laboratory, this method was followed in our study of the normal stomachs of infants at various ages, with or without known pathologic conditions. They were fed bismuth milk mixtures, and exposures were made at short intervals, with the baby in the *vertical* position. In this way only can one study the natural contour of this organ *in situ*, any anomalies of its size or position, or new growths.

It was soon borne in upon us, that our conception of the shape and activity of the infant stomach needed revision. Teachers have mainly based their views dealing with the size and shape of this organ upon the gross anatomy as found at autopsy, and in part upon the writings of the embryologist, who traces its development from the tube to the dilated pouch and the final transformation to the developed viscus, with a lesser and a greater curvature. The pictures which follow have been selected as representative and will give you some idea of the forms the infant stomach may assume and still apparently perform its functions.

Piersol, in his anatomy, says that the true shape of the stomach in life when not distended is very different but not thoroughly known. The normal development of the stomach is very variable, but it is impossible to define the limits between the normal and the pathologic. Naturally, therefore, statements differ widely as to it and are of little value. He gives the capacity at birth as 25 c.c. and states that the sphincter of the pylorus is already developed at birth.

Whether the stomach is at this time of life a natural reservoir, at the same time performing its share of the preparation of foods for the higher and more complex process of digestion in the duodenum, or whether it is simply a dilated pouch intended for the accumulation of a quantity of food, which is quickly acted upon by the gastric juice and immediately allowed to pass out through the pylorus, is a question for future and more elaborate study. The fact that we may observe (as in Fig. 13) the exit



FIG. 3—(SERIES A)

FIG. 3—CASE OF PYLORIC-SPASM.—C. M. D. Age, 11 weeks; weight, 7 lbs. 6 oz. Breast-fed infant (birth weight, 9 lbs. 5 oz.). Vertical position. Bismuth, 5 gms. in 50 c.c. fermented milk, introduced by gavage. Exposure 1 minute after introduction of food. No food has passed through pylorus. Stomach dilated. Greater curvature 5 cm. below umbilicus. Size, 11 cm. by 4<sup>1</sup>/<sub>2</sub> cm. Pyloric end passes 4<sup>1</sup>/<sub>2</sub> cm. to right of median line. Shape—cylinder with rounded ends. Long axis about 40° with median line. Gas in fundus. Moderate amount of gas in small intestine.

FIG. 4—Exposure 20 minutes later. Stomach now shows three peristaltic waves. Para pylorica visible with very fine stream of food—1 mm. in thickness—passing through. Only traces of food (that is, bismuth) have passed into the jejunum. (See FIG. 14 for comparison of amount passing. Passed through in practically same interval.)



FIG. 4—(SERIES A)



FIG. 5—(SERIES A).

FIG. 5.—Exposure 1 hour later. Shape changed, but still a very limited amount has passed into small intestine. (This amount, when compared to normal, is very striking.)

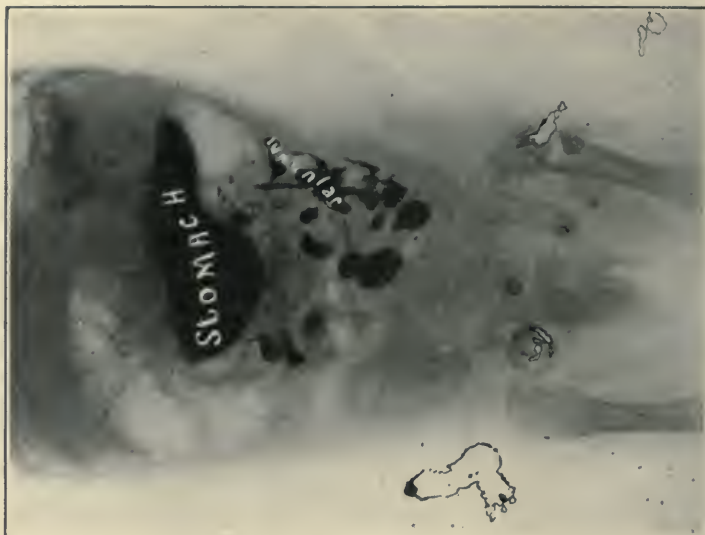


FIG. 6—(SERIES A).

FIG. 6.—Exposure after 1 hour and 25 minutes. Fairly good amount has now passed the pylorus. Evidently the spasm is less marked.



FIG. 7—(SERIES A).

FIG. 7—Exposuro after 1 hour and 40 minutes. Note outline of stomach. Decreasing amount of food in pyloric end, which is constantly to right of median line.

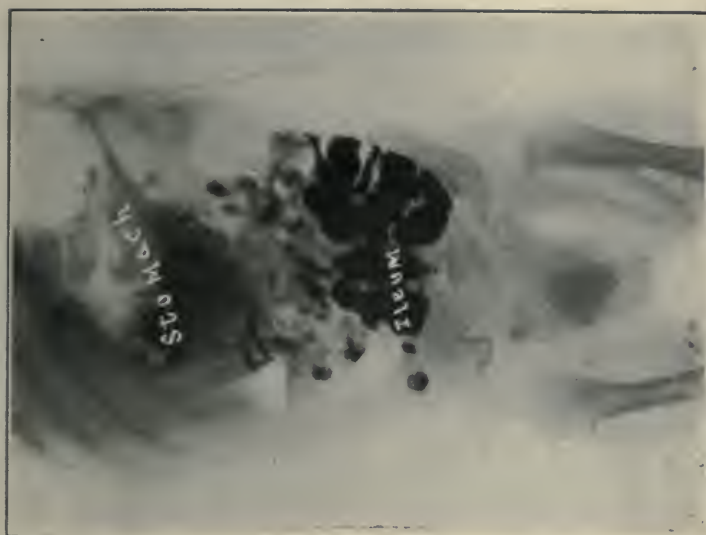


FIG. 8—(SERIES A).

FIG. 8—Exposuro after 3 hours and 45 minutes. Greater portion of meal has passed through. Traces of bismuth in pyloric end, apparently outlining the rugae. The meal has about reached the cecum.





FIG. 9—(SERIES A).

FIG. 9—Exposure after 4 hours and 20 minutes. Stomach now is empty. Shows some diminution in its size, though general shape remains. Size, 8 cm. by 3 $\frac{1}{2}$  cm. (At first, 11 cm. by 4 $\frac{1}{2}$  cm.)  
 FIG. 10—Exposure after 21 hours. Food is now fairly evenly distributed throughout the large intestine. (There has been no movement of the bowels.) General size and shape of colon is normal.



FIG. 10—(SERIES A).



FIG. 11—(SERIES B).

FIG. 11—STOMACH OF INFANT PREMATURE AT BIRTH. COMPARATIVE STUDY.—Baby S. Aged 3 months. Premature at 6½ months, but developing normally since birth. Breast-fed infant. 50 c.c. of mixture containing 7 gms. bismuth, introduced by gavage. Exposure 6 minutes later. Greater curvature 28 cm. above umbilicus. Pyriform with larger end at cardia. Size, 7½ cm. by 4 cm. The cardiac 2-3 lies nearly vertically. Pyloric 1-3 passes 2½ cm. to right of median line. At once apparent that a considerable portion has passed through the pylorus in 6 minutes. Gas is seen in the colon.

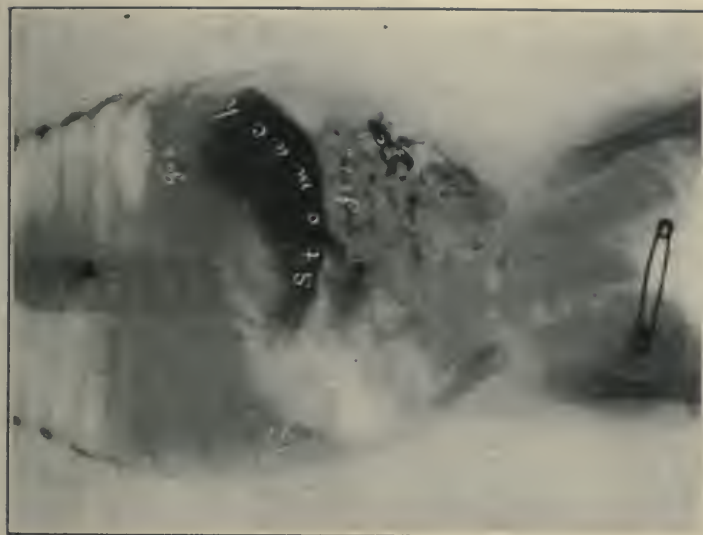


FIG. 12—(SERIES B).

FIG. 12—Exposure after 28 minutes. Showing marked diminution in amount of bismuth in stomach. (Scattered amount in small intestine.)



FIG. 13—(SERIES C).

FIG. 13.—NORMAL BABY.—Mary P. Aged 22 days. Artificially fed. 50 c.c. fermented milk, containing 7 grs. of bismuth, given. Exposure after 1 minute. Greater curvature 2 cm. above umbilicus. Shape of viscus almost identical with FIG. 15. Size, 8 cm. by 4 cm. Some bismuth has already passed into the duodenum, after 1 minute. (Compare with case of pyloro-spasm.)



FIG. 14—(SERIES C).

FIG. 14.—Exposure 16 minutes later. Considerable amount of bismuth has passed into the intestine in this interval.



FIG. 15—(SERIES D).

FIG. 15—NORMAL BABY—Edna B. Aged 9 weeks. Previously breast-fed. Complementary feeding just begun. 60 c.c. milk with 8 gus. of blamuth introduced. Exposure 2 minutes later. Size of stomach, 10 cm. by 4 cm. Pylorus 4 cm. to right of median line. Large amount of gas in cardiac end. Greater curvature 2 cm. above umbilicus. Food beginning to pass out. Note size and shape of stomach.



FIG. 16—(SERIES D).

FIG. 16—Exposure 24 minutes later. Remarkably rapid emptying of stomach in this time.





FIG. 17—(SERIES E).

FIG. 17.—MALNUTRITION.—Herbert W. Aged 4 months. Artificially-fed baby, with evidences of malnutrition. 125 c.c. milk, with 15 gms. bismuth, introduced. Exposure 8 minutes later. Enormously dilated stomach. Tobacco pouch shape, 7 cm. by 9½ cm. Pylorus in median line, and much relaxed, so that a stream 1½ cm. broad pours out. Unusually large amount of bismuth in small intestine for this interval. Greater curvature 2 cm. above umbilicus.

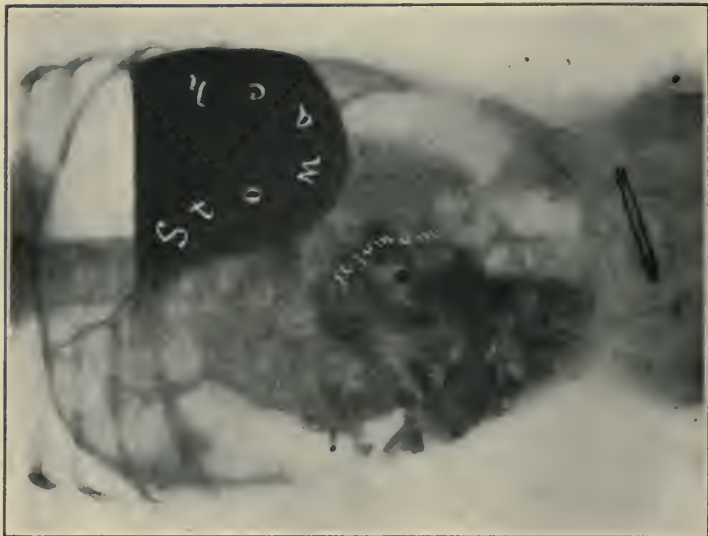


FIG. 18—(SERIES E).

FIG. 18.—Exposure after 15 minutes. Large amount of gas in cardiac pole, pushing heart distinctly upward. Shape remains same. Note the large amount of bismuth which has passed into small intestine in this interval of time. The colon shows gas distention. The apex of the heart is pushed upward.

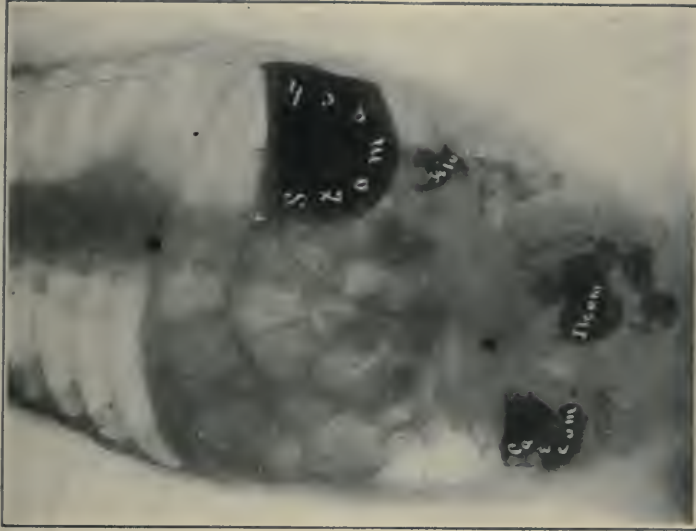


FIG. 20—(SERIES E).



FIG. 19—(SERIES E).

FIG. 19—Exposure after 35 minutes. At this level, what appeared like siphon action, has apparently ceased, and the bismuth is now extruded more slowly.  
 FIG. 20—Exposure after 3 hours. A large amount of residue is still seen in the stomach (which should now be empty). Some of the meal has reached cecum, and the stomach has contracted.



FIG 23—(SERIES F).

FIG. 23—Exposure after 45 minutes. At this time, after first early outpour, the rapid flow has moderated.

FIG. 24—Exposure after 2 hours and 25 minutes. Stomach not yet entirely empty. The bismuth has reached the cecum. The outline of the stomach still remains globular, although almost empty.



FIG. 24—(SERIES F).

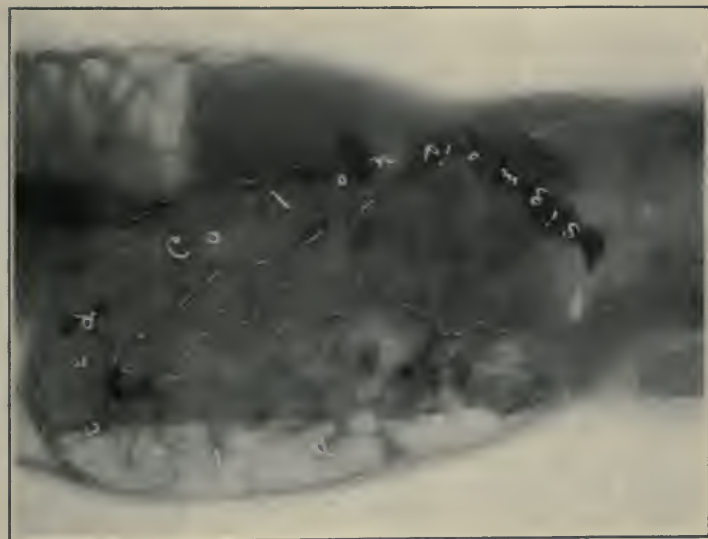


FIG. 21—(SERIES E).

FIG. 21—Exposure after 23 hours. A small residue still shows in the stomach. The colon is partly outlined by gas, and partly by bismuth. Some of meal has reached the sigmoid. Hepatic flexure is exceedingly high.

FIG. 22—Vomiting Case (DIAGNOSIS ENTERICUS)—Saddle C. Aged 7 months. Weight 11 lbs. 100 c.c. milk, with 15 gms. bismuth, introduced by gavage. Exposure 5 minutes later. Stools (pouch stomach). Greater curvature  $1\frac{1}{2}$  cm. above umbilicus. Rapid flow of meal into the small intestine. Size, 6 cm. by  $6\frac{1}{2}$  cm. (Compare outflow with case of pyloric-spasm.)



FIG. 22—(SERIES F).



of food into the duodenum within a minute or two after its intake rather tends to show that we may have been overvaluing this portion of the alimentary tract.

That liquid foods begin normally to be expelled in a very short time after they are taken into the stomach is very helpful in our diagnosis of conditions dealing with some form of pyloric obstruction, for, if we can demonstrate, with a degree of exactness, by a series of radiographs, that the milk is retained for a greater length of time than in a normal stomach, as shown by the bismuth shadow, we can determine with a fair degree of certainty with what type of obstruction we are dealing. If such striking results can be obtained by this means, it would seem to us manifestly unfair not to early obtain a series of radiographic pictures in every suspected case, so that the infant, suffering from a true tumor with a lumen so small as to practically occlude the passage of food into the duodenum may be early given over into the hands of the surgeon while its physical condition is still good. On the other hand, cases of pyloric spasm, even of marked degree but without tumor formation, *can* be differentiated, since the time and the amount of the food passing through the pylorus can be seen and thus the diagnosis, and even the prognosis, can be fairly well fixed.

The findings in this study have been so illuminating that the prophecy may be made that in the future every suspected case of pyloric obstruction will be subjected to a radiographic study before a plan of treatment is determined upon, just as to-day no surgeon would think of putting up a fracture without the use of the rays.

36 East 62d Street.

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ANAPHYLAXIS TO SALVARSAN.—H. F. Swift (*Journal of American Medical Association*) has observed that after repeated injections of salvarsan certain patients show symptoms of a respiratory and vasomotor nature like those seen in anaphylaxis, and in one of the author's cases there occurred a toxic erythema. Guinea-pigs which have been sensitized by the injection of a mixture of guinea-pig serum and salvarsan, and have been reinjected, after a suitable time, with the same mixture, show symptoms like those seen in anaphylactic shock. The mixture acts like a foreign proteid.—*Medical Record.*

## AN OBJECTIVE METHOD OF TEACHING FOOD VALUES AND FOOD REQUIREMENTS.\*†

BY CLIFFORD B. FARR, M.D.,

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In teaching the principles of dietetics to medical students, nurses, social workers and more particularly to the general public (as at the Baby Saving Show in Philadelphia), I make use of (1) charts, (2) graduated cylinders (metric) containing colored fluids, and (3) permanent specimens of foods preserved in graduated (common measure) containers.

The charts are worded tersely, somewhat dogmatically and at the same time as simply as possible. They cover, for example, the definition of foods and foodstuffs, the principal foodstuffs and their functions, the principle of the conservation of energy as applied to metabolism, the explanation of the use of the calory as a unit of food (energy) value, the caloric requirements at various ages, with special reference to weight and body surface. The following examples will suffice to illustrate their general character.‡

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*Foods* supply energy to body; replace (or prevent) waste of tissues.

Foods should have no injurious action upon the organism (alcohol).

Food accessories (flavors, meat juices, condiments) arouse appetite, stimulate secretion.

Food *materials* contain varying proportions of *foodstuffs*.

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Chief foodstuffs:—protein, fat, carbohydrate, water, salts.

Energy is never lost, but may take many forms. Chemical energy of food is converted by the aid of oxygen into heat,

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\*Read at a Joint Meeting of the Philadelphia Pediatric Society, New England Pediatric Society, Section on Pediatrics of the New York Academy of Medicine and the New Jersey Pediatric Society, held in Philadelphia, November 12, 1912.

†Supplementary to an article published in the ARCHIVES OF PEDIATRICS, February, 1912:—"The Comparative Caloric Value of Various Foods Used in Infancy and Early Childhood" (with seven illustrations).

‡Most of the other charts shown at the "Joint Meeting" as well as the details of some of the other exhibits are given in the forthcoming "Report of the Baby Saving Show," and also in a paper which is soon to appear in the Pennsylvania Medical Journal.

mechanical work, etc., yielding (nearly) inert carbon dioxide, water, urea.

In the actual charts important words or phrases are emphasized by arrangement, capitalization, etc.

FIGURE 1 illustrates the use of graduated cylinders to portray graphically the relative and absolute amounts of the chief foodstuffs required at different ages—early infancy, late infancy, adult life. For the sake of simplicity the requirements of a baby of 11 pounds and of a nursing mother of exactly ten times the weight may be compared. (We will ignore the other diet shown.)



FIG. 1.—This exhibit shows the chief foodstuffs needed at different ages. From left to right the different articles are protein, 15 grams; fat, 2.5 grams; milk sugar, 50 grams; water,  $1\frac{1}{2}$  pints; mineral salts; protein, 30 grams; fat, 40 grams; sugar and starch, 75 grams; water, 1 quart; mineral salts; protein, 90 grams; fat, 45 grams; sugar and starch, 400 grams; water, 2 quarts; mineral salts.

In round numbers, 500 and 2,500 calories are demanded. The foodstuffs are represented by colored fluids in the cylinders, each cubic centimeter corresponding to 1 gram of the pure substance. Red represents protein, 15 and 90 grams respectively; yellow, fat, 25 and 45 grams; blue, carbohydrate, 50 and 400 grams. Water is shown in the large jars, 750 and 2,000 grams, and mineral salts (represented by common salt) in the small. I do not attempt to state the latter quantitatively. Many interesting comparisons may be drawn from this exhibit, *e.g.*, a baby needs, in proportion to his weight, four times as much water as his mother, five times as much fat, twice as much protein and equally as much carbohydrate.

FIGURE 2 represents the diet of an infant of ten weeks requiring 650 calories. On the upper shelf eight feedings of human milk (left) and a similar quantity of a modified milk of the same composition (right) are represented. The cylinders between show the amount of protein, fat and carbohydrate contained, to wit., 17.5, 35 and 72.5 respectively. On the lower shelf the quantity of skimmed milk (1 to 16) required to produce the same number of calories and on the right, in a similar manner,

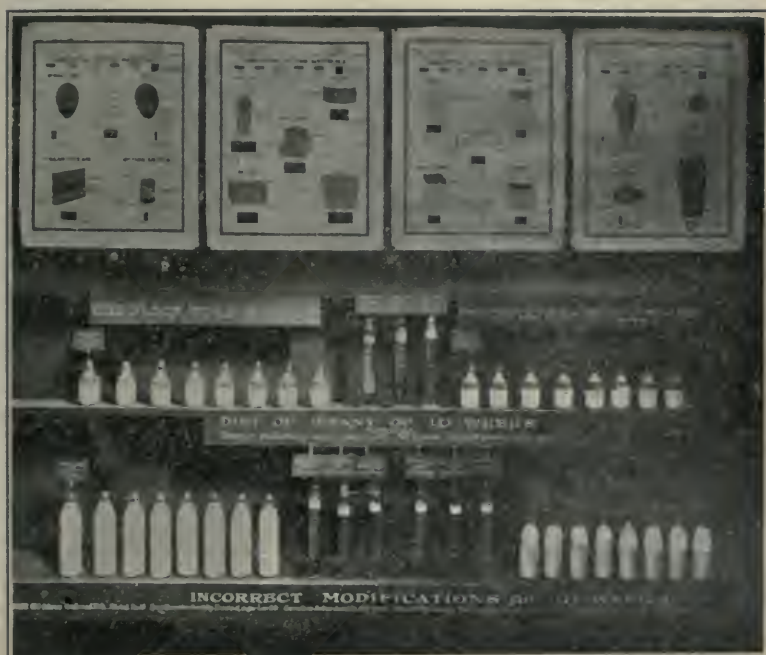


FIG. 2.—This exhibit shows at the top charts published by the United States Department of Agriculture, showing graphically food values. Below are shown the proper and the incorrect diets for an infant of ten weeks.

the quality of cow's milk diluted one-half are shown. The corresponding cylinders show the relative proportions of protein, fat and carbohydrate; for skimmed milk, 19, 16, 115; for diluted milk, 35, 40, 45. The labels point out the gross errors and suggest how they may be corrected. Another exhibit compares the relative cost of foods, but those which have been described are sufficient to illustrate the method of teaching.

The permanent museum consists of 100 or more graduated



bottles and jars, each containing a quantity of a given food, just sufficient to produce 100 calories (method of Irving Fisher). The quantities required are calculated from the best available chemical analyses, weighed out in grams or measured in cubic centimeter and preserved with formaldehyde or chloroform. The graduations on the nursing bottles translate these quantities into common measures of volume. The actual quantities of many



FIG. 3.—This exhibit shows foods, all having the same nutritive values (100 calories). In the upper left-hand corner the foods were chosen because of richness in sugars and starches. From left to right the substances are baked potato, 3 ounces; shredded wheat biscuit, 1; toast, 3 slices; 4 soda crackers; 1 ounce sponge cake; 2 even tablespoonfuls of milk sugar; 4 rounded teaspoonfuls of cane sugar; 2 even tablespoonfuls of malt sugar; 1 ounce of rice, unboiled, and after it has been boiled. In the upper right-hand corner are foods chosen for the richness in salts. From left to right are orange juice, 7 ounces; stewed prunes, 4 ounces; apple sauce, 4 ounces; cooked spinach, 6 ounces; carrots,  $\frac{1}{2}$  pound; asparagus, 1 pound. On the lower row, to the extreme left, are foods chosen for their richness in protein. From left to right are Neuchatel cheese; egg, large; split pea soup,  $2\frac{3}{4}$  ounces; egg white from 7 eggs; cow's milk, 5 ounces; skimmed milk, 7 ounces; buttermilk, 9 ounces; boiled halibut, 1-5 pound; white meat of chicken,  $\frac{1}{4}$  pound; tenderloin steak, 1-12 pound; pressed beef juice,  $1\frac{1}{4}$  pints; egg water, 3 pints; beef broth,  $2\frac{1}{2}$  quarts. In the center the energy value of three chief foodstuffs are compared: Protein, 25 c.c.; fat (oils), 11 c.c., and starches and sugars, 25 c.c., being equivalent. On the right are foods chosen for richness in fats. From left to right, bacon,  $\frac{1}{2}$  ounce; butter,  $\frac{1}{2}$  ounce; olive oil, 1 tablespoonful; yolk of egg,  $1\frac{1}{2}$  yolks; average cream, 4 tablespoonfuls; top milk,  $3\frac{1}{4}$  ounces.

articles are given in my original paper or in the papers of Fisher. The specimens are fully and distinctly labelled and formed into groups as follows: (a) Foods rich in protein, foods rich in fat, foods rich in carbohydrate, foods chiefly valuable for salts contained; (b) percentage mixtures and preparations used in infant feeding; (c) special dietaries, *e.g.*, diet of child of eighteen

months arranged in meals; (*d*) various forms and preparations of milk. In the latter case 150 calories are taken as a unit; in other words, the equivalent of a glass of milk.

FIGURE 3 shows the first group (*a*). The following articles are represented: (Carbohydrate foods) potato, shredded wheat, toast, crackers, sponge cake, milk, cane and malt sugars, rice, raw and cooked; (foods rich in salts) orange juice, prunes, apple-sauce, spinach, carrots, asparagus; (protein foods) cheese, egg, split pea soup, white of egg, milk, skimmed milk, buttermilk, fish, chicken, steak, beef juice, egg water, beef broth; (fat foods) bacon, butter, olive oil, yolk of egg, cream, top milk. The cylinders show the amount of protein (25), fat (11) and carbohydrate (25) required to produce 100 calories.



FIG. 4.—This exhibit shows the different forms in which milk may be given. Each article has the same food values (150 calories) as 7½ ounces of whole milk. Reading from left to right on the upper row are cream of chicken, cream of green pea, cream of spinach, cream of lettuce, cream of onion, cream of asparagus, cream of celery, cream of corn, cream of potato, cream of tomato soups, oyster stew, market cream, whey, skim milk, buttermilk and whole milk. On the lower row, from left to right, are barley, arrowroot, corn meal and oatmeal gruels, weak cocoa, malted food, bread pudding, tapioca pudding, blanc mange, rice pudding, rice, macaroni, soft custard, milk toast and junket.

FIGURE 4 shows the last group (*d*). Various forms of milk are exhibited—milk, cream, whey, etc.; a dozen different soups made with milk—cream of celery, chicken, etc.; milk gruels; milk puddings; rice and macaroni cooked in milk; milk toast, etc. For obvious reasons ice-cream was omitted.

## A METHOD OF SCORING THE VIABILITY OF INFANTS UNDER THE CARE OF HOSPITALS AND INFANTS' WELFARE ORGANIZATIONS.\*

BY HENRY L. COIT, M.D.,

Newark, N. J.

There is no work to which physicians devote their time and thought, with the object of securing results in preventive clinical medicine, which yields so satisfactory a return for their labor as that performed in infants' hospitals and consultations for mothers with nursing or sick infants, especially if this work is done with facilities for gathering reliable statistics.

Physicians give their time to medical charity, not alone for the experience gained (the motive usually ascribed to them), but they contribute their knowledge and judgment for the broader and more humanitarian purpose of reducing sickness and suffering, and they also entertain the hope that their labors will increase the viability of their fellows.

There are many different organized agencies employed for the reduction of infant morbidity and mortality. These are hospitals and clinics where infants are treated for a short time or intermittently and then returned to their homes, milk dispensaries, infant consultations, foundling asylums, orphanages and bureaus for placing out homeless or abandoned infants, schools for the training of infants' nurses, philanthropic associations not under hospital supervision for the training of mid-wives and maternity assistants designed for the protection and antenatal care of expectant mothers, municipal and other agencies which employ nurses to teach infant hygiene in the home and state, and federal agencies which, by ordinance and law, attempt to influence infant morbidity and mortality by gathering statistics, regulating the food supply and making more sanitary the homes of the poor.

The value of these agencies in their influence upon the reduction of sickness and death has been variously estimated by those who are engaged in one or another of the many depart-

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\*Read before the Joint Meeting of the Philadelphia Pediatric Society, the New England Pediatric Society, the New Jersey State Pediatric Society and the Section on Pediatrics of the New York Academy of Medicine, at Philadelphia, November 12, 1912.



ments of this work with a tendency to over-estimate the influence of the agency in which they are personally interested.

There is no efficient method at our command for determining the amount of sickness in a community or of analyzing the figures obtained as to the incidence of conditions causing sickness and death. Morbidity statistics are difficult, or impossible, to obtain, even through the compelling agencies of municipal or federal ordinance. Mortality statistics, for the most part, teach only economic facts in the numerical data furnished, yet these general facts concerning mortality are useful to those dealing with sickness in helping to determine how far their own work has influenced mortality among a similar class under their supervision and treatment.

The work of infants' hospitals, babies' wards, dispensaries, consultations and institutions or associations which extend their labors beyond the hospital to the home by giving instruction, assistance, material help, food, clothing and shelter and which are prophylactic rather than remedial, represents powerful influences, the value of which cannot be measured by mortality records.

All these efforts, in a greater or less degree, are directed against the causes and consequences of sickness, and some reliable method is needed to determine how far the work done influences the physical state of the living. It is important to follow the work beyond its prophylactic influence and, if possible, measure the progress of the individuals benefited toward an improved environment, a normal nutrition, immunity to disease and a maximum viability.

Most of the methods employed for recording the results of charitable work among infants show only gross numerical facts, such as "Improved," "Unimproved," "Cured" and "Died." These figures constitute the total record of results of medical supervision over a great variety of cases and represent a wide range of physical defects and diseases. They do not, however, indicate the influence of philanthropy through medical supervision or instruction upon the most important of all results, namely, the living prospects of the infants which did not die.

The gross numerical method characterizes most of the published data, whether it be from an infants' hospital, the infants' ward of a general hospital, an institution for foundlings or an orphanage; and the results of educational social work are usually recorded in like manner, either in the mortality records or the in-



fluence of the philanthropy upon the weight or environment of the infant without a comprehensive record of all factors contributing to the progress toward a normal physical condition.

In special hospitals, devoted to the care and cure of sick infants, it is usually difficult to keep the children under observation for a sufficiently long period to study to the full the effects of the work done in the hospital.

The infants' hospital, the educational work and the social service should be harmoniously interwoven into one system as a comprehensive whole, with the hospital management as the directing head of the system. The social service idea was originally designed to extend the influence and fix the benefits of hospital work among the poor.

Philanthropic agencies acting alone in this matter will not be able to accomplish great and lasting good, except with the aid of science and scientific facts, and such supervision can only be had through institutions equipped for scientific study and research into the physical welfare of infants.

When these various kinds of work are combined under the same direction, it would be desirable if some simple system could be formulated for the collection of facts which would show the relative value of the various kinds of work, whether philanthropic or scientific, upon the reduction of infant morbidity and mortality.

In this way only can it be learned how the many causative factors of morbidity and mortality are related to one another, or by which method of procedure the best results can be obtained in our hospital and charity work. At present it is a matter of individual opinion and many questions cannot be satisfactorily answered.

The percentage plan of scoring has been employed to determine the status of social, scientific and commercial investigations, but no comprehensive scoring plan has been adopted which would include in its scope all conditions which influence the care, the physical condition and the living powers of the infant.

The method presented consists of a statistical score card and is designed for the collection of facts to determine the influence of environment, of management, of nourishment and of morbidity upon the viability of the infant, with a graphic chart to show the improvement in viability during a given time through the activities of a hospital, a medical philanthropy or educational

work when directed to the betterment of the conditions which influence the life of the infant.

The chief object of such a system of scoring is to determine whether our work is worth while, whether we are barely saving the infants by carrying them across the living line, or whether we are giving them security and restoring them to a normal maximum of viability.

It would not be a satisfactory result of our work, either in the hospital or social service, to find that we turn out chiefly weaklings so handicapped by the effects of disease that life becomes a continuous struggle and our beneficiaries finally become dependent.

Such a plan should be flexible enough to be easily adapted to any line of medical work with infants, either in the hospital, the clinic or institution and through which the children may be followed to their homes and kept under observation for a considerable period after the institutional treatment has been terminated.

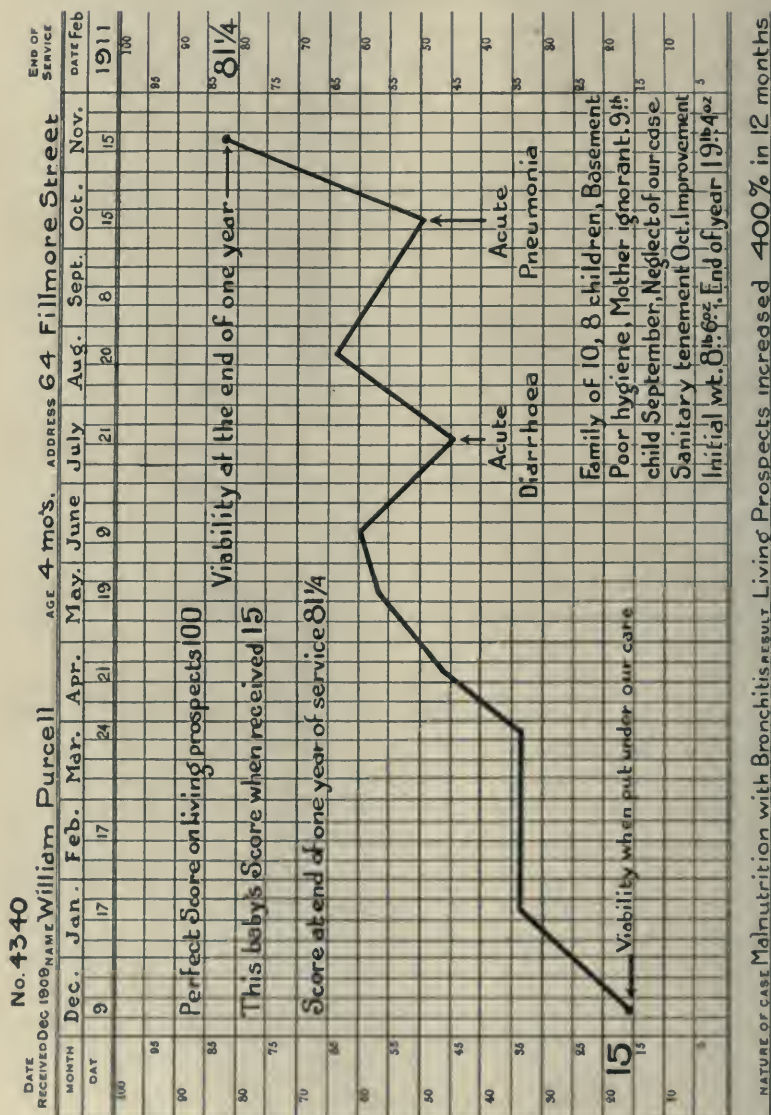
It should be so simple and clear that one not versed in medical matters can score accurately on the medical record. The value of the factors, except in a few extrinsic relations, should be maximum and negative, so that personal judgment, which is always variable in individuals, may not show errors in marking the score. This can be accomplished best by fixing values only on perfect conditions, which includes all the intrinsic factors.

In scoring the physical state, values should be given only on organic or functional integrity. Attempts to give values to the different diseases must be abandoned as impossible. For the purposes of such a system, it is necessary to eliminate all values for physical states which are not normal. The total values are divided equally between the extrinsic and intrinsic factors, 200 being allowed to each.

In order to make satisfactory use of the method herewith presented, it is best to carry the investigations beyond the hospital, clinic or consultation. It will require the work of a physician to determine the physical condition of the child and to dictate or write its medical history. It also requires the service of a visiting nurse to see the case periodically in its home, to weigh it and mark the weight chart, to make records of the environment, the hygiene, the management and care; to instruct the mother or caretaker, to note any subsequent or intercurrent illness and to make

## VIABILITY CHART

Obverse of Monthly Score Card (6½ x 9 in.).





## MONTHLY SCORE CARD

	THE MANAGEMENT												
	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	
EXTRINSIC FACTORS	TYPE OF CARE-TAKER												
	CLEAN, CAREFUL, CAPABLE, 10												
	INCORPETENT, BUT TEACHABLE, 5												
	IGNORANT, IDOLENT AND INDIFFERENT, 0												
	NUMBER OF CHILDREN												
	ONE CHILD ONLY, 10												
	TWO CHILDREN UNDER TEN, 5												
	MORE THAN TWO CHILDREN UNDER TEN WITH HELP, 5												
	MORE THAN TWO CHILDREN UNDER TEN WITHOUT HELP, 0												
	SYSTEM IN CARE												
	FOOD—REGULAR, 10, IRREGULAR, 0												
	SLEEP—REGULAR, 10, IRREGULAR, 0												
	THE BED—GOOD, 10, POOR, 0												
	THE BATH—DAILY, 10, IRREGULAR, 0												
	CLOTHING—PROPER, 10, IMPROPER, 0												
EXTRINSIC FACTORS	THE ENVIRONMENT												
	ROOM-SPACE AND VENTILATION—ADEQUATE, 10, INADEQUATE, 0												
	SUNLIGHT AND AIR—SUFFICIENT, 10, INSUFFICIENT, 0												
	HOUSE SANITATION—PERFECT, 10, IMPERFECT, 0												
	THE NOURISHMENT												
	NATURAL BREAST MILK, 100												
	BREAST MILK AND BEST BOTTLE, 80												
	BEST BOTTLE FEEDING, ADJUSTED BY MILK LABORATORY OR ACCURATE HOME MODIFICATION AND WELL PRESERVED, 70												
	MILK DISPENSARY OR DIET KITCHEN MILK, WELL PRESERVED, 60												
	GOOD MILK, WELL ADJUSTED AND PRESERVED BUT POORLY PREPARED, 50												
	PATENT FOOD AND GOOD MILK, WELL PREPARED AND PRESERVED, 40												
	GOOD MILK, WELL ADJUSTED AND PREPARED BUT SUBJECT TO CHANGES IN KEEPING, 40												
	POOR BREAST MILK WITH GOOD BOTTLE, 30												
	POOR BREAST MILK WITH POOR BOTTLE, 20												
	INTRINSIC FACTORS	MISFIT FEEDINGS OF POOR COWS' MILK (HEATED) CONDENSED MILK OR DRIED MILK, 10											
CARBO-HYDRATES ONLY (CEREAL AND SUGAR WATER), 5													
POOR COWS' MILK IN ANY MIXTURE USED RAW, 0													
SECOND YEAR FEEDING													
RATIONAL, 100, UNBALANCED, 50, IMPROPER, 0													
THE PHYSICAL STATE													
Score only on Organic and Functional Integrity													
RESPIRATORY SYSTEM—ORGANS, 20—0, FUNCTION, 10—0													
CARDIAC AND CIRCULATORY SYSTEM—ORGANS, 20—0, FUNCTION, 10—0													
NERVOUS SYSTEM (CENTRAL)—ORGAN AND FUNCTION, 10—0													
NERVOUS SYSTEM (MOTOR AND SENSORY) ORGANS AND FUNCTION, 10—0													
HEAT REGULATING SYSTEM—FUNCTION, 10—0													
DIGESTION AND ABSORPTION—ORGANS, 10—0, FUNCTION, 10—0													
GLANDULAR SYSTEM—ORGANS AND FUNCTION, 10—0													
GENITO-URINARY SYSTEM—ORGANS, 10—0, FUNCTION, 10—0													
LYMPHATIC SYSTEM—ORGANS AND FUNCTION, 10—0													
THE BLOOD—NORMAL, 10, ABNORMAL, 0													
CUTANEOUS SYSTEM—ORGAN AND FUNCTION, 10—0													
EXPOSED MUCOUS MEMBRANES—ORGANS AND FUNCTION, 10—0													
MUSCULAR SYSTEM—ORGANS AND FUNCTION, 5—0													
OSSEOUS SYSTEM—ORGANS, 5—0													
NUTRITION—ACTIVE, 10, PASSIVE, 0													
TOTAL SCORE		60	130	130	130	183	210	220	160	235	245	180	325
PERCENTAGE SCORE		15	32½	32½	32½	46¼	52½	55	40	58¾	61¼	42½	81¼

Reduced (size 6½ x 9 in.).



records of progress in any or all of the conditions involved.

The scoring should be done each month by a statistician or the physician. It will not require expert judgment to estimate the value of the different factors as based upon the medical history of the records of the visiting nurse. It is also necessary that the nurse should interpret her records for the statistician who marks the score card.

The maximum score being fixed in each line of investigation, it is easy to determine the progress due to the influence of the physician's work, nurse's work, or their work combined. The total score for the month, if averaged, will represent the same ratio and this figure, with the subsequent monthly scorings, will show the improvement in the physical condition of the individual.

The total score for the month, expressed in figures and averaged, is transferred to the graphic percentage chart designed to show the improvement in the case during the possible period of one year.

This graphic chart may also be used to express the viability of the individual at the beginning and at the end of the year and the average of the first and last scorings of those who have been under observation during the entire year will show their average viability and the gross advantage of the work of the philanthropy.

An attempt at simplicity has been made both with respect to the comprehensiveness of the data to be gathered and the method of recording it. Very little writing is required; negative answers require no entry; positive answers, except in a few instances, may be indicated by a check or cross and the medical history may be written with very little labor.

The difficulties in estimating the value of some of the factors in a scheme like this are apparent. Prenatal causes are not included in the score, since the baby cannot be scored until it has arrived and is presented to the medical agency for its welfare.

It seemed desirable to estimate the value of ample money support and its opposite condition—poverty; but it was found that these were both indicated in the environment of the home, the facilities for good care available in each case and the adequate or inadequate food supply.

Under management and care, after estimating the values of type in the caretaker, it was found that the number of other children in the family was an important element in lowering the living prospects of the infant, the best results being obtained with



the single child to care for. It was discovered that a ten-year-old child would be able to help the mother and that the problem of numbers begins to be unlocked at this age so that the scoring includes only children under ten years of age.

Under nourishment, the maximum score is based upon the possibility of normal breast feeding and the classes or kinds of food are scaled down to a minimum in the order of their relative nutritive value as compared with good breast milk. The principle used in fixing these values is our personal estimate of what the increase in the general infant mortality would be if all babies were deprived of breast milk, and were compelled to depend upon mixed feeding, rational bottle feeding, patented food with good milk, patented food with poor milk, dried milk, condensed milk or carbohydrates only. Scoring the mixed diet in the second year is a simple matter of judgment.

The morbidity score is based upon the integrity of the various organic and functional systems in the body. An attempt has been made to allow a value for organic integrity when its function only is impaired. Impairment of either the organ or its function at the time of marking the score should eliminate its maximum value.

When two factors (organic and functional) are mentioned with one value, it is because neither the organ nor the function can be disordered without impairing the integrity of the other.

The initial scoring of each case is based upon the medical history taken at the hospital or consultation when the child comes under observation and then from period to period the initial record should be checked on the intercurrent excursions from normal organic and functional integrity as indicated by the hospital record or the record of the visiting nurse, the variations being determined by the physician.

The principles of the system may be stated as follows:—

- (1) Simple and brief enough for clerical efficiency.
- (2) Comprehensive as to facts and figures.
- (3) Distinct divisions for separate estimations of sociologic, hygienic or morbid influences.
- (4) Correct distribution of the combined factor values.
- (5) Factor values not affected by varying individual or flexible judgment.
- (6) Graphic record of results.

*277 Mt. Prospect Avenue.*

## HISTORICAL.

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### THE PEDIATRIC SECTION OF THE NEW YORK ACADEMY OF MEDICINE.

1888.

BY FLOYD M. CRANDALL, M.D.

The history of the Pediatric Section of the New York Academy of Medicine reflects the history of the special branch of medical practice known as pediatrics. It is a very young specialty. It seems to have been an inborn belief of mankind that any one could treat a baby, and for centuries the grandmother, in popular estimation, ranked ahead of the physician when babies were the patients. On September 5, 1855, a section was formed in the New York Academy of Medicine upon "Obstetrics and the Diseases of Women and Children." Dr. Isaac E. Taylor was the first chairman. He was a man of high standing and large practice, but neither he nor any of his associates seemed to feel that there was any incongruity between gynecology and pediatrics. In this, however, they were in line with every medical college in the country. A few colleges had lecturers on diseases of children, but they were subordinate to the professor on obstetrics and gynecology. It seemed to be the theory of that day that a man who could remove a pyosalpinx was abundantly qualified to feed a baby or treat croup.

In the early eighties there began to be an awakening on the part of the profession in regard to pediatrics. Jacobi had long been teaching that the diseases of children were such as to require special knowledge and experience, but he was still the voice of one crying in the wilderness. As late as 1889 he found it necessary to assert that pediatrics does not deal with miniature men and women with reduced doses and the same diseases in smaller bodies; that a baby is not simply a small-sized man.

The eighth decade of the nineteenth century was a momentous



one for the specialty of pediatrics. A Section on Pediatrics was established in the American Medical Association in 1881. In 1884 Dr. William Perry Watson founded the ARCHIVES OF PEDIATRICS. This was the first journal in the English language devoted to the diseases of children and was a powerful factor in that formative period in establishing the specialty and giving validity to the title "pediatrics," which was then new. Many prominent men in the profession refused to recognize it as a legitimate special department. This feeling was still so strong that it seemed important to me when I assumed the editorship in 1895 to give marked attention to the matter, and many editorials upon pediatrics as a special department of medicine may be found in the issues of that and succeeding years. The ground was taken that pediatrics was a true specialty and was allied to general medicine rather than to obstetrics and gynecology.

In 1889, in the introduction to Keating's Cyclopedia, Jacobi held that pediatrics should not be considered as a "specialty" on the ground that "it does not deal with an organ, but with the entire organism at the very period which presents the most interesting features to the student of biology and medicine." It is true that pediatrics is unique in that it deals with a class of patients, not with an organ, and that most pediatric patients are treated by general practitioners. But special knowledge warrants the title of specialty, whether it relates to an organ or to a class of patients. I fully recognized this condition when I wrote in an editorial article in 1896 the sentence: "Pediatrics is the 'specialty' of the general practitioner." The fact that most infants and children are treated by general practitioners does not invalidate the farther fact that there are today many physicians in every city who have made a special study of "pediatrics" and are giving their whole attention to the special diseases of a special class of patients. Pediatrics has its practitioners, its professorships, its local and national societies, its journals, and its books.

Keating's Cyclopedia of the Diseases of Children was a notable landmark in American medicine and was published in 1889. It was an admirable presentation of pediatrics as it was known twenty-three years ago.

In September, 1888, the American Pediatric Society was organized and held its first meeting in Washington on September 20, 1889. This was another powerful factor in establishing pediatrics as it now stands as an independent specialty. As the

result of changed and more enlightened views, the old section of the Academy of Medicine formed in 1855 had become very unsatisfactory to pediatric men. After many conferences and much argument, a new section was formed, called the Section on Pediatrics. It held its first meeting on January 25, 1888. Dr. J. Lewis Smith was the Chairman and Dr. Jacobi read the first paper, the title being "Sepsis in the Newborn." This, I think, was the first local pediatric society in this country. Among the names prominent at that time we find the following: Jacobi, Smith, O'Dwyer, Caillé, Carr, Chapin, Crandall, Dorning, Holt, Huber, Koplik, Northrup, Ripley, Seibert, Winters, and Yale.

The history of the Pediatric Section of the New York Academy of Medicine has been somewhat varied. Much of the time it has been one of the most popular sections of the Academy and the attendance has been large. It has, however, been about what its Chairman has made it from year to year. In some societies the presiding officer is a figurehead, the programmes and business of the society being in the hands of committees or subordinate officers. This is not so in the sections of the Academy. The Chairman and Secretary arrange the programmes and conduct the Section as seems to them best, their powers being very slightly limited. Men prominent in pediatric work have been accorded the honor of chairmanship year by year, and this is eminently proper. But great professional attainment is not always coupled with the peculiar knack necessary to make medical society meeting attractive. In New York the medical societies are so numerous that it is impossible to get out an audience to an unattractive meeting. Hence, the meetings of the Pediatric Section have varied considerably at times in attendance and in the value of the programmes.

After the formation of the Pediatric Section in 1888, it went on most satisfactorily under the successive chairmanships of Smith, Jacobi and Holt. The first enthusiasm over the new specialty then began to wane somewhat. The meetings came to be held but once in two months and even then were attended chiefly by the Chairman and Secretary. Something had to be done to rescue the Section, or it would have been discontinued by the authorities of the Academy. Therefore, the devoted men of pediatrics got together and unanimously selected William P. Northrup as the man who could best pull it out of the slough of despond into which it had fallen. He took hold of a rather

desperate situation. Things at once began to move, and physicians began to come to the meetings by the room-full. Standing room only became the rule and the attendance has never sunk to a very low ebb since that time. Dr. Northrup was succeeded by Dr. H. D. Chapin, and he in turn by Dr. J. E. Winters, both being men with the knack of medical society management largely developed.

Since that time the Section has had its ups and downs, but has never gone far down, and the question of its being retained by the Academy long since ceased to cause disquietude. The number of workers in the department has largely increased and in New York, at least, the position of pediatrics is acknowledged and secure.

Some of the men of twelve or fifteen years' standing, who are now doing such splendid work in the department, will, perhaps, scarcely realize the arguments that were necessary twenty-five years ago in behalf of pediatrics, and they may find it difficult to appreciate what strides have been made in establishing it on a firm and lasting basis. For a quarter of a century the Pediatric Section of the New York Academy of Medicine has been an active and potent factor in establishing pediatrics as an entity among the specialties of medicine.

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## THE PHILADELPHIA PEDIATRIC SOCIETY.

1896.

BY THEODORE LE BOUTILLIER, M.D.

The Philadelphia Pediatric Society was founded in December, 1896, through the instrumentality of Dr. J. P. Crozer Griffith.

According to the Constitution of the Society its objects are as follows: "The promotion of the study of disease in children in all its branches, the exhibition of cases, the reading of papers and the holding of discussions, and the exhibition of pathologic specimens and apparatus bearing upon pediatrics." These objects have been consistently carried out during the sixteen years

which have elapsed, and today the scope has broadened considerably.

It has always been the aim of the Society to have an address delivered, at least once each year, by some pediatricist of note, usually from some other city, and by so doing secure the most advanced ideas from other medical centers.

The clinical side has always been a feature at the meetings, several patients being exhibited, beside having the last meeting in the spring and the first meeting in the fall a purely clinical night.

Symposia are given from time to time on diseases or subjects of special or momentary interest. Meetings are also held with Societies of related interests, for example, the Philadelphia Pathological Society and the Philadelphia Obstetrical Society.

The work of the Milk Commission of the Philadelphia Pediatric Society is of the greatest benefit to the community in raising the standard of purity of milk for babies and children. This Commission was appointed in 1899, being among the first in the country. Its work and responsibility has increased from year to year, until at the present each farm which produces certified milk is visited by two members of the Milk Commission each month and a report of conditions found then made to the whole Commission, this besides the regular visit of the veterinarian and the work of the chemist and bacteriologist.

The Committee of Child Hygiene has been active in the crusade against infant mortality, and in conjunction with other organizations were instrumental in organizing and bringing to a successful conclusion "The Baby Saving Show," which was held in Philadelphia last May and June, and which had a powerful influence for good, not only among the very poor, but also among the well-to-do of our city. An outgrowth of this "Show" is the Child Hygiene Committee of Philadelphia, which has been organized to carry on the work thus started.

The Librarian of the Society is authorized to expend a certain sum of money each year for the purchase of books, periodicals or other publications upon the diseases of children, which works are kept in the library of the College of Physicians.

This year a prize of \$100 was offered by the Society for the best original paper on any subject pertaining to pediatrics, and it is hoped that this will be awarded annually.



## THE NEW ENGLAND PEDIATRIC SOCIETY.

1908.

BY JOHN LOVETT MORSE, A.M., M.D.

The New England Pediatric Society was organized January 4, 1908, at a meeting called by the staff of the Boston Floating Hospital to consider the advisability of establishing such a society. The original members numbered between forty and fifty. The first president was Dr. T. M. Rotch and the first secretary Dr. A. H. Wentworth, both of Boston.

The object of the Society, as stated in the Constitution, is "The Advancement of the Study of Infancy and Childhood and of Disease as Manifested at these Ages." The membership is not limited; any registered physician in the New England States being eligible to membership, unless objected to by the council. There is also provision for an honorary membership of ten. The officers are a president, a vice-president, a secretary and treasurer, and a council. The council consists of three members, one of whom retires annually and is not immediately eligible for reelection. The council acts as a Committee on nominations to Office, is a judicial committee with regard to questions of admission and discipline, and advisory committee for the officers and for the Society as a whole, and has general charge of the finances of the Society. The entrance fee is one dollar and the annual dues have thus far been but two dollars.

The Constitution states that three or more meetings shall be held annually. Four or five is, however, the usual number. These meetings have, in most instances, been held in Boston. The papers are usually read by the members, but some well-known pediatrician from some other city is invited to address the Society each year. A very pleasant feature of the past two years has been the combined meetings with the Section on Pediatrics of the New York Academy of Medicine and the Philadelphia Pediatric Society.

The standard of the meetings is very high, well up to that of the national societies. The attendance is about 33 per cent. of the membership. The thing which has done more than anything else to keep up the interest of the meetings has been the strict enforcement of that article of the constitution which states that

papers by members shall not exceed twenty minutes in length, and that remarks in discussion shall be limited to seven minutes.

The present membership is 138, the majority of whom reside in Boston and its immediate vicinity. All the New England States except New Hampshire are, however, represented. The members living at a distance attend the meetings more regularly, on the average, than do those living nearby, and among the most constant attendants are a number of men to whom each trip means a great sacrifice of both time and energy. The Society has been a success from the beginning and promises to continue to grow in numbers and to increase in usefulness, not only to the medical profession, but also to the community as a whole.

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## THE NEW JERSEY STATE PEDIATRIC SOCIETY.

1910.

BY ELMER G. WHERRY, M.D.

It had been suggested in 1908, by Drs. Coit, McAlister, Bell and others, that the physicians of New Jersey who were interested in pediatrics organize a state pediatric society, but it was not until January 11, 1910, when a symposium on infant feeding was held at Hackensack under the auspices of the Bergen County Medical Society, that actual organization took place. At this meeting Dr. Coit, of Newark, was elected president *pro tem.* and Dr. Martin J. Synnott, of Montclair, secretary. A committee of seven, besides the chairman were appointed to arrange for a constitution and by-laws, which were adopted on January 14, 1910. The officers elected for the first year were: Dr. Coit, president; Dr. Alexander McAlister, vice-president; Dr. Martin J. Synnott, secretary, and Dr. B. Van D. Hedges, treasurer.

Since its inception the Society has prospered. Besides its annual meeting it has held three other meetings each year. Its membership now numbers over fifty, and includes not only physicians but a few others who are interested in child welfare work. The objects of the Society are set forth as follows:

First: To unite the physicians, teachers and others in the

state who are engaged in the scientific study of infancy and childhood.

Second: To promote by its concerted efforts scientific research in the department of pediatrics and in any field of child conservation.

Third: To foster a general interest in pediatrics by physicians and to extend the knowledge of approved methods used for the welfare of children.

Fourth: To study the problems of infant mortality and to popularize a knowledge of infant hygiene and of the means for the protection of child life.

The officers of the Society at the present time are as follows:

Alexander McAlister, M.D., President, Camden, N. J.

Martin J. Synnott, M.D., Vice-President, Montclair, N. J.

Elmer G. Wherry, M.D., Secretary, Newark, N. J.

B. Van D. Hedges, M.D., Treasurer, Plainfield, N. J.

*Council.*—Henry L. Coit, M.D., Chairman, Newark, N. J.; J. Finley Bell, M.D., Englewood, N. J.; Burdette P. Craig, M.D., Jersey City, N. J.; Thomas N. Gray, M.D., East Orange, N. J.; Francis H. Glazebrook, M.D., Morristown, N. J.; J. D. Milton Miller, M.D., Atlantic City, N. J. The officers *ex-officio*.

TREPHINING FOR HYPERTENSION IN CHILDREN. — Broca (*Archiv. de Méd. des Enf.*, August, 1912), dealing with trephining for the relief of pressure, points out that the operation, in some acute cases, is followed by rapid watery effusion, and that in others it is not unusual for the patient to die, in coma, in the course of twenty-four or forty-eight hours or so, with raised temperature. In fact, decompression may lead to rapidly fatal consequences, but then, Broca thinks, it must be remembered that at the most there has been shortening of the days of those condemned to death, and that sometimes we can cure, and sometimes relieve. In the course of a *revue générale* on the same subject in the same paper, it is urged that decompressive craniectomy is dangerous in cases of tuberculous tumor, and should not be performed in acute meningeal cases, though it has a legitimate sphere of influence in the chronic ones. Lannelongue's operation in cases of idiocy is pronounced a failure.—*Universal Medical Record*.

## SOCIETY REPORTS.

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### THE PHILADELPHIA PEDIATRIC SOCIETY.

*Stated Meeting, Held November 12, 1912,*

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

This was a joint meeting of the Philadelphia Pediatric Society with the New England Pediatric Society, the Section of Pediatrics of the New York Academy of Medicine, and the New Jersey Pediatric Society. The meeting was held in Thomson Hall, College of Physicians, and was largely attended.

The papers were:

THE TREATMENT OF HEMORRHAGIC DISEASE OF THE NEWBORN.

By DR. BETH VINCENT, Boston, Mass. (See p. 887.)

PYLORIC OBSTRUCTION, WITH A COMPARATIVE STUDY OF THE NORMAL STOMACH OF INFANTS.

By DR. GODFREY R. PISEK, of New York. (See p. 911.)

AN OBJECTIVE METHOD FOR TREATING FOOD VALUES AND FOOD REQUIREMENTS.

By DR. CLIFFORD B. FARR, of Philadelphia. (See p. 927.)

A METHOD OF SCORING THE VIABILITY OF INFANTS UNDER THE CARE OF HOSPITALS AND INFANT'S WELFARE ORGANIZATIONS.

By DR. HENRY L. COIT, of New Jersey. (See p. 932.)

#### DISCUSSION.

DR. EDWARD E. GRAHAM, Philadelphia, Pa.—I should like to know whether a sufficient number of cases have been examined to decide definitely whether a small portion of the stomach contents passes into the duodenum within one or two minutes after



the bismuth has been introduced into the stomach. It is possible that the amount of fluid introduced into these stomachs was excessive. If this is true the portion leaving the stomach can hardly be affected by the gastric secretion.

DR. FRITZ B. TALBOT, Boston, Mass.—In some cases it is impossible to get these babies X-rayed, and in these cases I am accustomed to giving the baby subnitrate of bismuth by mouth. This agent is crystallizable and can be readily observed microscopically in the stools. Absence of typical bismuth crystals from the stools means that no food is passing through the pylorus.

DR. HARRY LOWENBERG, Philadelphia, Pa.—I wish to report 1 case of pyloric obstruction in which the bismuth shadow did not show beyond the spinal column. My charts represent 2 cases of partial pyloric obstruction showing the weekly and the daily gain in weight. In the case in which the shadow did not show beyond the spinal column a tumor was palpable. The diagnostic value of the administration of charcoal should be emphasized. If this substance passes through the prognosis is hopeful, whether the condition is a hypertrophy, a spasm or a mixed condition. Another case sent to be as pyloric obstruction was found by X-ray methods to be a case of twist in the sigmoid and the vomiting was probably reflex. There are certain dangers connected with the use of the stomach tube in these cases. In 1 case the tube could be palpated in the right iliac fossa and an X-ray with the tube *in situ* showed that the lower border of the stomach had been pushed down.

DR. HENRY L. COIT, Newark, N. J.—The abuse of a saturated solution of borax, so generally used in washing out infant's mouths, is sometimes, if not often, to blame for the occurrence of pyloric spasm, stenosis, and even gastric ulcer.

The problem of scoring the different diseases is impossible. As for medium factor values, this is recognized and reckoned for some of the extrinsic factors, but in marking the factors in the physical state my three years' attempt to mark medium score has been abandoned as unnecessary and unwise.

DR. J. FINLEY BELL, Englewood, N. J.—I reported a case of congenital hypertrophic pyloric stenosis before the New York Academy of Medicine, which was published in the ARCHIVES OF PEDIATRICS February 11, 1909. In this case there was no palpable

tumor that could be found after repeated examinations. The patient was operated upon; a section of the muscle was removed which, on microscopic examination, proved to be normal muscular tissue. The excess of muscular tissue was sufficient to resemble a tumor, so that one could not state positively that the absence of a palpable tumor in a case of pyloric stenosis argued conclusively for pyloric spasm and against actual stenosis.

One unailing test is the character and amount of matter which passes. If the stools are infrequent and consist largely of green mucoid material without much milk in the feces, the child has a positive obstruction, probably anatomic at the pyloric orifice, and even though with a marked spasm element such a child should be operated while there is yet a chance for withstanding the shock of an operation.

Dr. Pisek's work suggests that in the diagnosis of any continued abnormal digestive condition in infants the X-ray-bismuth method should never be omitted from the examination and must always precede rational treatment.

DR. WALTER LESTER CARR, New York.—There are certain cases of pouched stomach in which the peristaltic wave appears to the left of the median line. Many of these cases are in infants fed artificially and cannot be classified as cases of pyloric spasm or pyloric obstruction, although showing a reversed peristaltic wave.

DR. GODFREY R. PISEK, New York.—In answer to Dr. Graham it may be said that in the normal stomach the contents invariably began to pass through within a very short time, *i.e.*, within a few minutes of their ingestion. In cases of pyloric tumor or pyloric spasm the meal remained in the stomach for some time, and this fact was a very helpful point in diagnosis. In cases of pyloric obstruction in which there was no tumor palpable, it might be that no bismuth was extruded for a half hour, and then, in cases of pyloric spasm, it would gush through. This was an aid in making a prognosis of these cases. The cases to which Dr. Carr referred were not those of pyloric obstruction. In artificially-fed babies the stomach contents appeared to pass readily through the pylorus. The point which Dr. Talbot made regarding the use of bismuth subnitrate was a very good one. It might be used where no radiographs were available, but it would only show that something could pass through the pylorus.

## BOOK REVIEW.

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NEW ASPECTS OF DIABETES. By CARL VON NOORDEN, Professor of the First Medical Clinic, Vienna, Austria. 8vo. Pp. 160. New York: E. B. Treat & Co., 1912.

In the first half of this book, von Noorden discusses in lecture form some of the more recent facts and theories in regard to diabetes mellitus. The liver is particularly insisted upon as the ultimate seat of the disease. No diminution of glucose oxidation is assumed to be present in the tissues, but the theory of an overproduction of glucose from glycogen by the liver as the cause of hyperglycemia and glycosuria of diabetes is advocated. The influence of the various internal secretions and the food stuffs on the liver function is thoroughly discussed. The production of sugar from fat is insisted upon. Von Noorden goes into these theoretic considerations in a very personal way—he puts forward his own ideas and those developed at his clinic to the exclusion of others. However, this form of presentation, coming from an authority in the field of diseases of metabolism, is not lacking in interest.

The second half of the book is devoted to the therapy of diabetes and to acetonuria. Here nothing essentially new is offered. To those desirous of keeping in touch with the subject this part of the volume gives a review of the more important points to be kept in mind in the treatment of diabetes. These are presented in the clear didactic style in which von Noorden is a past master.

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PNEUMONIA AND BRONCHOPNEUMONIA IN INFANCY.—Maillet (*Gaz. des Hôp.*, August 8, 1912) discusses the relative benignity of true pneumonia in infancy as compared with bronchopneumonia, and finds this essential difference, that the one is a general infection calling for rapid general defensive reactions, to which demand children are well able to respond; while the other condition is one which is local and which requires local defences, in which respect children are physiologically weak. The bearing of this pathologic conception on practical therapeutics needs no elaboration.—*Universal Medical Record*.











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